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Colonel C. Mackie Begg, C.B., C.M.G. (F)
A.D.M.S. New Zealand Division, D.D.M.S. IInd Anzac and XXIInd Corps.
Died on Service, 1919.

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The New Zealand Medical Service in the Great War 1914-1918

Based on Official Documents

By
LIEUT.-COL. A. D. CARBERY
C.B.E., (D), N.Z.M.C. (Res.)

WHITCOMBE & TOMBS, LIMITED.
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TO

THE MEMORY OF

THE OFFICERS, NON-COMMISSIONED OFFICERS

AND MEN

OF THE NEW ZEALAND MEDICAL CORPS

WHO FELL

IN THE SERVICE OF HUMANITY

IN THE GREAT WAR

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ABBREVIATIONS.

"A"	Administrative Staff.
A.A.G.	Assistant Adjutant General.
A.A.M.C. or A.M.C.	Australian Army Medical Corps.
A.A. & Q.M.G. ..	Assistant Adjutant and Quartermaster General.
A.D.M.S.	Assistant Director of Medical Services.
A.D.O.	Administrative Dental Officer.
A.D.S.	Advanced Dressing Station.
A.I.F.	Australian Imperial Force.
A.L.H.	Australian Light Horse.
A.M.S.	Army Medical Service.
A. & N.Z.A.C. ..	Australian and New Zealand Army Corps.
A.P.M.	Assistant Provost Marshal.
A.Q.M.G. ..	Assistant Quartermaster General.
A.S.C.	Army Service Corps.
A.T.S.	Antitetanic Serum.
B.I.P.	Bismuth, Iodoform, Parolin (paste).
B.R.P.	Bearer Relay Post.
C.A.M.C. ..	Canadian Army Medical Corps.
C.C.S.	Casualty Clearing Station.
C.G.S.	Chief of the General Staff.
C.M.D.S. ..	Corps Main Dressing Station.
C.P.D.I. ..	Chronic Pulmonary Disease, Ideterminate.
C.R.E.	Commanding Royal Engineers.
C.S.M.	Cerebro-Spinal Meningitis.
C.T.	Communication Trench.
D.A.A.G. ..	Deputy Assistant Adjutant General.
D.A.C.	Divisional Ammunition Column.
D.A.D.M.S. ..	Deputy Assistant Director of Medical Services.
D.A.H.	Disordered Action of the Heart.
D.A.Q.M.G. ..	Deputy Assistant Quartermaster General.
D.D.M.S. ..	Deputy Director of Medical Services.
D.G.M.S. ..	Director General of Medical Services.
D.D.S.	Director of Dental Services.
D.M.H.	Director of Military Hospitals.
D.O.R.A. ..	Defence of the Realm Act.
D.R.S.	Divisional Rest Station.
E.T.	Early Treatment (V.D.).
"G"	General Staff.
G.H.Q.	General Headquarters.
G.O.C.	General Officer Commanding.
G.S.	General Service.
I.G.S.	Imperial General Staff.
I.M.S.	Indian Medical Service.
L.O.C.	Lines of Communication.
M.A.C.	Motor Ambulance Convoy.
M.C.V.	Mixed Catarrhal Vaccine.
M.E.F.	Mediterranean Expeditionary Force.
M.O.	Medical Officer.
M.T.A.S.C. ..	Motor Transport Army Service Corps.
N.C.O.	Non-Commissioned Officer.
N.C.I.	Napthalin, Camphor, Iodoform (powder).
N.T.O.	Naval Transport Officer.

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ABBREVIATIONS.—*continued.*

N.Y.D.	Not yet Diagnosed.
N.Z.A.N.S. ..	New Zealand Army Nursing Service.
N.Z.D.C. ..	New Zealand Dental Corps.
N.Z.E.	New Zealand Engineers.
N.Z.E.F.	New Zealand Expeditionary Force.
N.Z.F.A.	New Zealand Field Artillery.
N.Z.G.H.	New Zealand General Hospital.
N.Z.M.B.F.A. ..	New Zealand Mounted Brigade Field Ambulance.
N.Z.M.C.	New Zealnd Medical Corps.
N.Z.M.R	New Zealand Mounted Rifles.
N.Z.P.S.	New Zealand Permanent Staff.
N.Z.R.B.	New Zealand Rifle Brigade.
N.Z.S.C.	New Zealand Staff Corps.
O.C.	Officer Commanding.
O.R.	Other Ranks.
P.B.	Permanent Base.
P.D.M.S.	Principal Director of Medical Services.
P.M.O.	Principal Medical Officer.
P.O.W.	Prisoner of War.
P.U.O.	Pyrexia of Uncertain Origin.
"Q"	Quartermaster's Branch of the Staff.
Q.A.I.M.N.S. ..	Queen Alexandra's Imperial Nursing Service.
Q.M.	Quartermaster.
Q.M.G.	Quartermaster-General.
R.A.M.C. ..	Royal Army Medical Corps.
R.A.P.	Regimental Aid Post.
R.E.	Royal Engineers.
R.H.A.	Royal Horse Artillery.
R.M.O.	Regimental Medical Officer.
S.B.	Stretcher Bearer.
S.M.O.	Senior Medical Officer.
T.A.B.	Typhoid, Paratyphoid A. and B. (Vaccine).
T.F.	Territorial Force.
T.V.	Typhoid Vaccine.
V.A.D.	Voluntary Aid Detachment.
V.D.	Venereal Disease.

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INTRODUCTION.

By Major-General Sir W. G. Macpherson, K.C.M.G., C.B., LL.D.

In the published volumes of the General History of the Medical Services during the Great War of 1914-1918, limitations of time and space and other cogent considerations precluded detailed accounts being given of the work of individual medical units of divisions, corps and armies. The preparation and publication of the more detailed and individual records have accordingly become the task of the units of the Dominions and Territorial Forces that took part in the war. A volume containing the history of the New Zealand Medical Services has consequently definite historical importance and will be welcomed alongside the volumes of the General History as an essential portion of the history of the medical services as a whole.

A fact that is apt to be forgotten is that one of the first blows against the power of the enemy was dealt by a New Zealand Force in the capture of Samoa in August, 1914. New Zealand medical personnel had thus an experience of active service from the earliest days of the war. Subsequently the New Zealand Army Medical Corps took part in the operations in Egypt and Palestine, on the Gallipoli Peninsula, in Macedonia, in France and Belgium, and established hospitals in the Dominion's overseas base in England. Their units had thus a wide experience in many theatres of war. They shared, with Australians, the immortal fame and glorious record of the Anzac Corps during the operations at the Dardanelles in 1915, when they formed part of the combined Australian and New Zealand Division. When they were transferred to the Western Front in 1916 they were in a position to display their qualities in a still more distinctive manner as units of a homogeneous New Zealand Division. But wherever and, however, the officers and other ranks of the New Zealand Army Medical Corps were employed their efficiency was a matter of common knowledge, while their devotion to duty and their unwavering cheerfulness in the midst of difficulties, their enthusiasm and determination to give of their best excited the admiration of everyone who had in any degree administrative control over them.

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The medical profession in New Zealand responded nobly to the Empire's call. Three hundred and eighty-five out of some seven hundred doctors embarked for service overseas as officers of the medical corps, together with 3,248 other ranks. There also embarked for service in the medical units 550 nursing sisters, one of the most poignant memories of whom is the loss by drowning of ten of their number when the transport conveying the New Zealand Stationary Hospital for Imperial Service in Macedonia was torpedoed in the Aegean Sea towards the end of 1915. This tragedy of the war was one of the greatest calamities from which the medical services suffered.

It was my privilege to have been in close administrative touch with the New Zealand Medical Services in Salonika, on the Western Front, and in the Southern Command in England; and I had thus ample opportunity of obesrving their efficiency and the excellent spirit and discipline of their personnel. The development of a high standard of organization as time went on was one of the features that attracted attention. During the battles of Messines and on the Ypres front in 1917, for example, the arrangements of the New Zealand Division for the collection and evacuation of wounded were regarded as historically instructive on account of the careful manner in which the details were prepared beforehand and the smoothness with which the work was carried on during the fighting.

In this brief introductory note, however, to the volume on their history during the war, no attempt has been made to emphasise or summarise the chief features of the work of the New Zealand Medical Services. It would be outside my province to do so; but it may be recorded without fear of contradiction that, while the grim realities of war brought out the salient qualities of the various elements of which the armies of the British Empire were composed, in the experience of one who saw much of the medical services of all of them in the field, on the lines of communication and in their base hospitals and depots none displayed more conspicuously than those of New Zealand the characteristics of all that is best in the British race. The facts recorded in this volume will, I feel sure, bear witness of the truth of this to all who read it.

W. G. MACPHERSON.

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PREFACE.

Early in 1919 the work of collecting the necessary material for this volume was initiated at N.Z.E.F. Headquarters in London. By direction of the late Colonel C. M. Begg, C.B., C.M.G., then acting as D.M.S., the compiler with a small staff of non-commissioned officers of the N.Z.M.C. was attached to the New Zealand War Records Section for the purpose of collating the documents and making a digest of the war diaries and correspondence.

At the same time a Medical Research Committee was constituted —with Lt.-Col. B. Myers, C.M.G., as chairman—whose duties were to prepare memoranda on the prefessional work of the N.Z.M.C. officers and to make a collection of case notes, specimens, diagrams, casts, models and drawings for a medical war museum. It was then intended that the technical papers, to be edited by the Consulting Physician, Lt.-Col. Marshal Macdonald, C.B.E., and the Consulting Surgeon, Major T. D. M. Stout, D.S.O., should form part of the proposed Medical History.

At the inception of the work much needed direction was given to us by the Australian War Records Section established some nine months previously: and particularly to Colonel A. Graham Butler, C.M.G., D.S.O., collator of the A.I.F. Medical War Records we are much indebted for helpful guidance and for many copies of documents relating to the Gallipoli Campaign. Also to Lt.-Col. F. S. Brerton, R.A.M.C., collator of material for the British Official Medical History, we wish to acknowledge indebtedness for valued advice and for digests of Imperial War Diaries.

In the preliminary task of collating the records the compiler was ably assisted by the N.Z.M.C. staff which included Q.M.S. F. W. Hartman who directed the office, S.-Sgt. F. W. Foster, M.S.M., head clerk, S.-Sgt. Hyde, Corporals T. G. Hughes and Clapham, and Pte. T. V. Haydon who compiled the historical and medical bibliographies, of which a minor portion is reproduced in the Appendix.

Our thanks are due to Major-Genl. Sir. W. G. Macpherson, K.C.M.G., C.B., LL.D., editor of the Official Medical History, who has honoured us by writing the introduction, for reviewing a preliminary draft of the work to be produced and advising the collator as to the form our history should take; and to Lt.-Col. B. Myers who helped us in collecting documents and by valuable suggestions.

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The work of the Medical Research Committee and of the Medical War Records Section was prosecuted without interruption until the repatriation of the members at the close of 1919 when work was discontinued owing to the necessities of Demobilisation and Reconstruction in New Zealand; and it was not until three years had elapsed that it was found possible to undertake the writing of the history.

In March, 1923, the Director-General of Medical Services, Sir Donald McGavin, appointed a committee of the N.Z.M.C. Regimental History constituted as follows:—

PRESIDENT:
Major-General Sir Donald McGavin, KT., C.M.G., D.S.O.

MEMBERS:

Col. P. C. Fenwick, C.M.G.	Lt.-Col. J. S. Elliott
Col. H. J. McLEAN, C.B.E.	Lt.-Col. C. E. Hercus, C.B.E., D.S.O.
Col. D. N. W. Murray, C.M.G., D.S.O.	Major T. D. Stout, D.S.O.
Col E. J. O'Neill, C.M.G., D.S.O.	Major Bowerbank, O.B.E.

The Regimental Committee agreed that our Medical History should take the form of a narrative of the operations of the N.Z.M.C. in the various campaigns of the Great War and that purely medical considerations should be subordinated to a general account of the activities of the medical units and formations in a military sense. It seemed to the committee that it was unnecessary to include the scientific papers prepared by our Medical Research Committee as the Official History of the War and the many post-war text-books already covered the ground in a superlative manner. But some of the published works of our officers and their contemporary contributions to medical literature are cited in the bibliography of this volume, and the valuable collections which they made for the war museum are preserved in the Medical School at Dunedin.

In conformity with the recommendations of the Committee, this volume, designed partly as a Regimental History of our corps, is addressed to the general reader and is not an official medical history of the N.Z.E.F., although based on the War Diaries, Dispatches, Reports, Military Correspondence, and State Documents, of the various periods outlined. It covers the whole of the campaigns of the Great War in which the N.Z.M.C. were engaged: in Samoa, in Egypt, at Gallipoli, on the Western Front, in Sinai and Palestine; and in a short introductory chapter traces the origins of the Corps, its early traditions, prewar organisation and training. Contemporary advances in war medicine and surgery are referred to

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in the various phases of the campaigns and the progress of preventive medicine is noted, in brief, as seems indicated by the context. Something also is recorded of the evolution of our enterprising Dental Service, of the New Zealand Army Nursing Service, and of the help so generously given, in tending the sick and wounded, by our Voluntary Aid Societies and Patriotic Bodies, both overseas and at the home base.

Special consideration has been given to the medical administrative problems of the home base. In 1914, as regards medical administrative formations, we were not prepared for war: with the exception of a small number of N.C.O. instructors there was no permanent N.Z.M.C. staff, the officers were territorials, a few only had specialised in medico-military science, a very small proportion had previous war service, the majority had little if any training in military duties.

The difficulties of the part-time D.M.S., the late Colonel Purdy, were intensified by the early embarkation of many of the senior and best trained officers. The lack of military hospitals, laboratories, and trained staffs at first prevented the D.M.S. from undertaking the care of the sick and wounded repatriated of whom over 3,000 had returned in 1915. Recruiting and Invaliding Boards had in most instances, no previous experience of this important work, so that over-recruiting and excessive invaliding resulted in a serious loss of man-power to the community. But it is clear that both the recruiting officers and those engaged on Invaliding Boards were much overworked, as already by the end of 1915 over 20 per cent. of the male arm-bearing population had joined up voluntarily. Our medical man-power was sorely taxed to meet all requirements as the total number of practitioners did not much exceed 700.

But the limitations of the Medical Administrative Staff in New Zealand were to as great an extent imposed upon the Military Administrative Departments: partly for lack of trained officers, but chiefly owing to the difficulties met with in improvising an Administrative Staff for War within a Defence Department devised for local territorial forces only. Much trial and error and many painstaking revisions were necessary: but ultimately, with a Minister of remarkable strength of character, the Hon. Sir James Allen, at its head the Department of Defence and its medical branch emerged, if not scatheless, yet as sober victors in the struggle for efficiency. Our Diminion is not singular in this respect, all the combatant nations have a like story to tell of their war-time organisation for war. The student of military medical history will find much that is necessary

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to supplement what is here reported of the Home Base in the fourth volume of the New Zealand Official History entitled, "The War Effort of New Zealand," edited by Lieut. H. T. B. Drew, in 1923, and in the Bibliography (Appendix II.) will be found references to contemporary documents and publications most essential to a right understanding of the vicissitudes of the times.

The general reader will consult with advantage the New Zealand Official Histories relating to Gallipoli, Palestine and France in which the context, illustrations and maps will serve to supplement omissions in the present volume necessitated by limitations of space. The medical reader is directed to the British Official History of the Medical Services which is authoritative and comprehensive beyond all praise. Owing to a desire for simplicity foot-notes and references to medical literature have been avoided as much as possible in the narrative and the inclusion of maps and diagrams in the body of the text. The necessary references, when not acknowledged, are to be found in the Bibliography which includes a few notes that may serve as a guide to further investigations. The index has been systematised to facilitate the study of special problems in ambulance work, in the tactical employment of field medical units, and in medical administration generally.

To the committee of the N.Z.M.C. Regimental History the compiler desires to express his acknowledgment of valued assistance in reading and revising the manuscript and for much useful advice. Many points of critical importance have been reviewed in conference with the committee and attached officers of the N.Z.M.C., and at all stages of the recent work this co-operation has been a very real help.

Thanks are also due to the Hon. the Minister of Defence, Sir Heaton Rhodes who kindly read the proofs of chapter XI. and advised in the revision; and to Sir Donald McGavin who colaborated in the revision of Chapter XXII., and at all times took the liveliest interest in the progress of the work; also to Lt.-Col. C. Guy Powles, C.M.G., D.S.O., who read over the manuscript of the section dealing with Sinai and Palestine and made many useful suggestions; and lastly to Lt.-Cols. Hand Newton and C. E. Hercus who rendered a similar service and to whose notes the chapter in question owes much for revision and amplification.

The type-script was read and approved on behalf of the General Regimental Histories Committee by Capt. V. G. Jervis, N.Z.S.C. librarian at General Headquarters whose assistance in procuring documents and books of reference, and help in the verification of place names was invaluable. An ever ready helper in reviewing

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some of the all too voluminous state correspondence of the war period was found in Mr. D. Lyons, officer in charge of the Central Registry at General Headquarters.

The official lists of the dead, wounded, honours and awards were compiled by the War Records Office as also a special nominal roll of all those who died by disease in the N.Z.E.F. from which the analysis of deaths by disease was extracted. For this laborious work we are indebted to Mr. Clemens and more especially to Major L. C. Forgie, officer in charge of War Records, to whom our thanks are also due for help at all stages of the compilation and for valued assistance in arranging the details of publication and distribution.

To the many members of the Corps who assisted by conference, by narratives, or the loan of private diaries and to F. J. Johns, Esq., for permission to use the private letters of his son, Major Noel Johns, M.C., we are much indebted.

In the introduction, Sir W. G. Macpherson outlines the relations of the Dominion Medical War Histories to the British Official History and welcomes the added detail furnished by the lesser records. To supply detail has been the objective of the present volume since the inception of the work. In many chapters the recital of seemingly unimportant things must be tedious to the general reader. But it may be that it is just this chronicle of minor matters which will prove most helpful to others of our Corps who—at some remote date, so be it—may need guidance in time of stress. To help them has been our aim so that profiting by the records of the past they may be the better equipped for their onerous duties: to preserve life and to mitigate human suffering in war.

A. D. C.

CORRIGENDA.

Page 36, 14th line from bottom, for E. O'Neil *read* E. J. O'Neill, and subsequent text.

Page 160, 9th line, for Lt.-Col. E. O'Neil, D.S.O., *read* E. J. O'Neill, and subsequent text.

Page 266, 2nd line, for Mills, Lt.-Col. *read* T. Mill, and subsequent text.

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NOTES ON SOME MILITARY FORMATIONS.

The following is appended for the information of the non-military reader. The figures are approximate, the conditions, those existing in the New Zealand Division in 1916 and 1917.

A BATTALION OF INFANTRY: 34 officers, 896 rank and file; has 4 companies. Each battalion has a:—

REGIMENTAL MEDICAL DETACHMENT: 1 officer N.Z.M.C. the R.M.O.; 5 N.Z.M.C. for water purification duties; 2 orderlies, one of whom drives the Maltese cart carrying medical and surigcal equipment; the battalion chiropodist. Each company of the battalion provides 4 stretcher bearers and a certain number of men for sanitary duties. In action the 16 regimental stretcher bearers may be increased in number to 32.

A BRIGADE OF INFANTRY: 4 infantry battalions and a headquarters, commanded by a brigadier. To each brigade a field ambulance is attached—

A FIELD AMBULANCE: 10 officers (9 medical, 1 Q.M.), 20 warrant or non-commissioned officers, 211 rank and file N.Z.M.C. An ambulance is divided into 3 sections, A, B, and C, each section comprises a tent-subdivision and a bearer subdivison.

A BEARER SUBDIVISION: 1 officer, 1 sergeant, 1 bugler, and 36 bearers. Duties: to collect the wounded from the R.A.P. and carry them to the car collecting posts or to the advanced dressing station. The total bearer personnel of the field ambulance, 3 officers, 3 sergeants, and 108 bearers, with 4 men to the stretcher can carry 27 lying cases in one trip.

A TENT SUBDIVISION: provides 2 medical officers with non-commissioned officers and orderlies acting as clerks, nurses, stewards and cooks and can shelter, tend and feed 50 patients. The 3 tent subdivisions provide accommodation for 150 patients in all; but by the use of buildings many more can be housed and tended for short periods. All essential surgical operations can be performed by the tent subdivisons if required.

AMBULANCE TRANSPORT: 7 motor ambulance cars to each field ambulance and 3 horsed ambulance waggons. Capacity: cars, 28 lying wounded, waggons, 12 lying or 36 sitting cases. The medical, surgical equipment, nursing appartus, tents and blankets are carried in general service waggons. The drivers are attached from the A.S.C. or the M.T.A.S.C.

INFANTRY DIVISION (see Appendix B. IV.).

The medical personnel includes, the A.D.M.S., the D.A.D.M.S., the officer in charge Sanitary Section, 3 field ambulances and R.M.O.S., making 53 officers, 682 rank and file N.Z.M.C. total personnel with the division.

INFANTRY CORPS: 2 or more divisions.

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CHAPTER I.

Formation and Organisation of the N.Z.M.C.

The origins of the New Zealand Army Medical Service may be traced back to the earliest days of organised settlement in New Zealand. Although the New Zealand Medical Corps, as constituted at the outbreak of the Great War, dates only from 1908, a Colonial Medical Corps pre-existed and was in being with unbroken succession from the time when a small body of devoted surgeons attached to militia and volunteer formations in 1845 formed the anlage from which our present Medical Corps has evolved.

From the initiation of the colonising schemes of the New Zealand Company some form of Colonial military forces existed in New Zealand in contemplation or in being. The warlike disposition and fighting qualities of the Maori race were known in England prior to Captain Cook's explorations, and at the time of the New Zealand Company's first emigrations in 1839 it was recommended by a select committee of the House of Commons that the New Zealand settlers should be enrolled in a militia. Prior to embarkation the prospective colonists were invited to sign an agreement that they would consent to be trained in a militia on arrival in the Colony, and by this undertaking all male emigrants became potential soldiers.

The Maoris, much devoted as they were to their ancestral lands, held in tribal communism, were lacking in a comprehension of the true nature of a land sale, and in many instances opposed in arms the settlement of the colonist on lands purchased by the New Zealand Company: the settlers were frequently harassed, sometimes driven out of their lands, and occasionally murdered. So that conflicts with the Maoris led at an early date to the enrolment of the New Zealand Militia. In 1845 the first Defence Act was passed entitled: "An Ordinance for raising a militia within the Colony"; by this enactment power was given to train the European population for the defence of the settlements, and all males were made liable for military service. In the New Zealand Gazette of April 11th, 1845, the embodiment of three militia regiments, in Auckland, Taranaki and Wellington, was authorised. Surgeons were appointed

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to these formations. The four military districts were constituted in 1858: Auckland, Taranaki, Wellington and Napier. Volunteer formations were enlisted in the following year, some of which had surgeons on their roll.

The long drawn out Taranaki-Waikato War of 1860-1870 had its roots in a much earlier period, and was founded in disputes concerning the sale of land in the Waitara District in 1840. At the inception of this war, in which Imperial troops were mainly concerned, Sir James Mouatt, V.C., C.B., then P.M.O. of the Imperial troops, was requested by Mr. Russell, at that time Minister for Defence, to organise the Colonial Medical Service. The Colonial forces, as apart from the "Royal" or Imperial troops, consisted of some eleven battalions of militia with seven squadrons of volunteer cavalry and thirteen volunteer rifle corps. The medical personnel in 1861 comprised eight surgeons and assistant surgeons in the militia regiments, and four surgeons on the strength of volunteer cavalry or infantry formations. Medical equipment and supplies were furnished from the "Royal" stores. It is on record that P.M.O. Mouatt rendered valuable services in this reorganisation. Those who are curious in the matter will find in appendix (i.) a nominal roll of the medical officers attached to Colonial troops as shown in the New Zealand manuscript Army List of 1862. We may say that these surgeons were the founders of the New Zealand Medical Corps.

Up to 1865 the Colonial troops, then about 1,500 strong had acted as auxiliaries to the Imperial troops, about 9,000 of all arms, but at this time a political movement was set on foot known as the policy of "Self Reliance," strongly supported by the Governor, Sir George Grey, and the Premier, Sir Frederick Weld. It was considered right that the colonists, now numbering some 150,000 souls, should bear the whole cost of the war, provided they had authority to direct and control it. A petition was submitted to the British Parliament to withdraw its troops and leave New Zealand to work out its own destiny. Major General Sir George S. Whitmore, K.C.M.G., then a colonel, was appointed Commandant of the New Zealand Forces comprising some 17,000 Colonial troops including militia, volunteers and friendly natives. Colonel Haultain was Defence Minister from 1865 to 1869, and the New Zealand forces were operating alone in 1867.

The New Zealand Medical Service was now under the control of Dr. Grace, an officer of the Imperial Army, then retired and settled in practice in Wellington. He had volunteered his services: he was appointed P.M.O. and was asked to inspect and

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reorganise the New Zealand Medical Department, which, according to Sir George Whitmore, was poorly equipped and organised; he says: "We were ill provided for a campaign as regards hospitals and medical department." The year 1870 closed the ten years period of the Taranaki-Waikato Wars. The New Zealand Medical Service now comprised three surgeons and 18 assistant surgeons. The rate of pay for a surgeon at this time was 18/- per diem; and a grant of 250 acres of confiscated land was guaranteed to those who saw war service. Several medical officers had gained distinction, amongst them Dr. J. M. Gibb, who was recommended for the New Zealand Cross for gallant conduct in the Taupo operations in 1869; he was afterwards appointed P.M.O. of the Taupo district. One member of the medical department, Assistant-Surgeon Walker of the Armed Constabulary, gained the coveted distinction of the New Zealand Cross on March 13th, 1869, at the attack on Ti to Kowaru's camp at Otauto. This gallant officer, although only a senior medical student, achieved no less distinction by his skill in surgery.

A period of reaction followed the war, the militia service became unpopular, the volunteer movement decadent. The causes were natural: laxity of commanding officers; general distaste for war amongst the volunteers who had been under arms for ten years; increasing prosperity of the Colony. A report of a committee set up to consider colonial defence in 1873 recommended a modified system of compulsory training, the number required to complete the strength of the volunteer corps to be filled by ballot. But volunteering was again stimulated in 1879 by fresh disturbances with the Natives: 1,500 men were under arms on the West Coast; the volunteer force numbered 8,032 with a medical staff of five surgeons, 19 assistant surgeons.

Again in October, 1881, the volunteers were called up for service at Parehaka. This campaign closed the period of Native wars and rebellions, and the years that followed saw no fighting in New Zealand, but the defence forces waxed and waned in strength in sympathy with European crises, the first of which was the war in Egypt in 1882. In this year a board of officers sat to consider the re-organisation of the Defence Forces. Amongst the recommendations made was the appointment of a Volunteer Surgeon General and the formation of "Ambulances"; there were at this time 46 surgeons and assistant surgeons in the Medical Corps. But it was not until five years later that the recommended appointment was made, when in 1887 the Hon. M. S. Grace, M.L.C., was appointed Volunteer Surgeon General.

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Under volunteer regulations drafted in 1888 a general medical list was formed of officers appointed to the "General Medical Service" of the New Zealand Defence Forces. Rank as a surgeon in the volunteer force was honorary only, but after five years' service in the volunteers a medical officer was eligible for enrolment in the army list. A battalion at this time had one surgeon-major and two surgeons; each senior officer was responsible that at least three men per battalion were trained and instructed in stretcher drill and field dressing. Men so instructed and approved by examination were to be selected as regimental stretcher bearers and were entitled to wear the Geneva Cross. The rates of pay were: for a Brigade Surgeon or S.M.O., 25/- per diem, with forage for one horse, 3/-; an S.M.O. Battalion 21/- and forage; a Surgeon 18/-; all when employed on military duty only. Promotion was by seniority: after twelve years' service to Surgeon-Major; after twenty years, to Brigade Surgeon; active service in the Maori War counted double towards promotion. There were four Brigade Surgeons on the Staff of the Surgeon General.

In succeeding years inspecting officers drew attention in their reports to the unsatisfactory state of the Medical Service. There was no medical equipment available, medical officers drew no capitation grant; the more zealous were obliged to provide the necessary drugs and dressings for camps and manoeuvres at their own expense. The medical officers, although discontented, were reported to be deserving of great praise for the efficient training of the "Ambulance" details attached to the corps. There was no provision for field hospitals nor base hospitals. Medical equipment was urgently required. In 1897 Colonel A. P. Pole Penton, R.A., appointed to command the New Zealand forces, in his first annual report drew attention to the fact that there was no organised method for providing medical aid to troops in case of war, and recommended the calling together of a small committee of volunteer medical officers to consider the matter; he further advised the appointment of a P.M.O. to each military district. In the following year a volunteer establishment was fixed for the Colony including four ambulance corps. A P.M.O. was appointed to each of the military districts, Auckland, Wellington, Christchurch and Otago. Bearer companies were now enrolled in each of the military districts; they had a peace establishment of two officers, and 25 other ranks. Medical stores and equipment were issued to districts.

The outbreak of the South African war caused much temporary activity in the volunteer force. The number of men volunteering for active service was so great that there was no difficulty in

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recruiting the 10 contingents of mounted rifles raised in the period 1900-1902; in all, 6,505 officers and men were embarked. The contingents, varying in strength from 220 (the first), to 1,218 (the ninth), had one medical officer attached to most of the smaller contingents, and two or more to the larger. 26 medical officers, about one third of whom were of the New Zealand Volunteer Medical Staff Corps, were enlisted in the New Zealand Militia and proceeded over seas with the troops, taking with them what medical equipment was then available in New Zealand. On arrival in South Africa a certain number acted as regimental medical officers, others, in excess of requirements, were posted to military hospitals.

The summary of deaths in the New Zealand troops on service during this war is of interest, not only because it reflects the general sickness wastage of the British Army in South Africa, but because it demonstrates an unusual preponderance of deaths from pneumonia.

DEATHS IN NEW ZEALAND CONTINGENTS ON SERVICE IN THE SOUTH AFRICAN WAR, 1900-1902.

Killed in action or died of wounds	68
Accidentally killed	25
Died from disease	139
Total deaths on service	232

of the deaths by disease no less than 57 per cent. were from enteric and 25 per cent. by pneumonia; there were six deaths from dysentery, four attributed to C.S.M. and two to malaria. The bulk of the deaths from pneumonia were the result of a serious outbreak of measles on board a returning troopship, the *Britannic*, which embarked 1,080 officers and other ranks at Durban on the 5th of July, 1902. When 10 days out from port the first cases of measles were observed; the infection, it is stated, was brought on board by details of the 10th Contingent, drafted from a camp in which the disease was prevalent. At first sporadic cases were admitted to the ship's hospital, two deaths from pneumonia occurring at sea, but after calling at Melbourne measles became epidemic, with a marked incidence of pulmonary complications—on arrival in New Zealand 62 cases of pneumonia were disembarked, of which 20 terminated fatally after landing. The Principal Medical Officer of the transport, Surgeon-Major R. Peerless, of the New Zealand Volunteer Medical Staff Corps, in giving evidence before the "Contingents Transports Commission," in August, 1902, showed

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clearly that there had not been any overcrowding on board the ship; that discipline and sanitary provisions had been well maintained; that the hospital requirements were adequate; that he had a staff of three medical officers, and eight other ranks, and that he was quite satisfied with the medical arrangements. In his opinion the onset of pneumonia was determined by the sudden change from a dry climate and an open air life to confinement on board ship in a damp and cold latitude. Whatever the causes, the unusual incidence and the high mortality were at least suggestive of some predisposition in New Zealand troops. Among the medical officers who served in South Africa in the New Zealand contingents and who subsequently joined the N.Z.E.F. in the Great War, or served in New Zealand, were: Surgeon-General Skerman; Surgeon-Major Peerless, Surgeon-Captain P. C. Fenwick, Major Godfrey (deceased), and Surgeon-Captain E. O'Neil, of whom the latter two were mentioned in South African Dispatches.

The volunteer force doubled its strength during this war and was reorganised by collecting the various scattered companies into battalions. New regulations were framed dealing with the medical branch of the defence forces. All medical officers were appointed to the "General Medical List"; they could now earn capitation, the nominal service being six parades yearly and attendance on one Easter encampment in two years. The years following the South African War were a period of stagnation; interest in the defence forces failed in a very marked manner; the volunteer strength fell. Major-General J. M. Babington, Commandant of the Forces, on taking over in 1902, reported the medical services as being inefficient. "At present," he says, "beyond five bearer corps insufficiently equipped, and four ambulance waggons, the medical resources would barely meet the requirements of a battalion."

Colonel Skerman was appointed Surgeon-General in 1905. Regulations were amended; the chief medical amendment being the formation of the New Zealand Medical Corps. At this date there were two distinct corps: the medical officers attached to Bearer Companies and the New Zealand "Defence Medical Staff" on the "General Medical List" of the Volunteer Regulations of 1900. Provision was now made for the formation of a corps of officers to be called the "New Zealand Medical Corps," with ranks as follows:—Surgeon-General; Surgeon Lieut.-Colonel; Surgeon-Major; and Surgeon-Captain. Hereafter all commissions were to be granted, all appointments and promotions made by the Surgeon-General. Up to this time medical officers attached to formations held honorary rank only, and were elected by the company or other

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subdivison of a unit to which they were attached. Provision was made for the examination of officers with bearer companies in regard to their military duties. The general conditions of the medical service were not much bettered: there had been some improvement in the training of bearer companies but they were ill equipped; there was insufficient provision for the Surgeon-General and the district P.M.O.'s to visit and inspect medical units or to make themselves acquainted with their administrative duties; their activities were restricted to the towns in which they lived—which was not unnatural—as they were all busy practitioners. General Babington in his last report, dated 1906, attributed the decline of volunteering to:—A dearth of a leisured class to provide officers; less cordial relations between employers and employed; and extreme centralisation of command. He considered that the nomination of officers by election was highly unsatisfactory and that the Defence Act required amending in that respect. "It does not appear to me," he says, in his valedictory remarks, "that the Colony takes the question of defence seriously or gives due attention to a subject which is so vital."

The same year it was decided by Parliament that a "Council of Defence" should take the place of the previous administration and control of the forces by a general officer commanding and his staff. The policy of the Defence Council was outlined in their first report. It was held that the volunteer system was on its last legs and that radical changes were required to give it a final chance before compulsory training was introduced as foreshadowed in the recommendations of the "Colonial Defence Committee" of 1873. Amongst the various matters to be arranged was the re-organisation of the medical corps which, although it furnished excellent bearer companies at each centre, was lacking in administrative organistion.

The Defence Regulations of 1905 were amended in 1908, the chief "Medical" amendments being: the reorganisation of the New Zealand Medical Corps, on R.A.M.C. lines; the formation of field ambulances; and the establishment of an Army Nursing Reserve. Prior to this the N.Z.M.C. was a corps of officers only. There were still volunteer medical officers, not members of the corps, holding appointments as regimental medical officers under the old regulations. The previous regulations were so amended that all officers, non-commissioned officers and men connected with the medical service of the permanent force, militia, and volunteers should be formed into a corps called the New Zealand Medical Corps. The command of this corps was entrusted to the Surgeon-General, on whose staff two medical officers were to be appointed: one a sanitary

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officer and the other to act as secretary. All medical stores and equipment were placed under the Surgeon-General's control, and he was instructed to visit and inspect the various units of his command. Further emendations were the appointment of a chief sanitary officer, and the formation of a reserve of medical officers. Bearer companies were now converted to field ambulances with an establishment of four officers; one Q.M.; 46 N.C.O.'s and men: Total 51. Capitation grants earned by medical officers were to be credited to central funds to be utilised by P.M.O.'s of districts. Provision also was made for the examination of medical officers on the active list under conditions similar to those in existence for the R.A.M.C. A sanitary officer drawn from the public health service was to be attached to each military district. A New Zealand Medical Corps. Nursing Reserve was authorised. This formation, affiliated to the Royal Army Nursing Reserve, was to consist of qualified nurses willing to undertake the duties of army nurses in time of war; they were to form part of the military forces after enrolment; the ranks were:—Matron-in-chief; matrons; sisters; staff nurses. The first matron-in-chief was Miss Janet Gillies. The Surgeon-General's report of this year was not very favourable to the efficiency of the medical service; he considered that in many cases medical officers were ignorant of their duties, of military organisation and of their proper relations to the combatant branches. The strength of the N.Z.M.C. was: officers, 115 attached; 52 unattached; while the field ambulances personnel numbered 207, rank and file.

The Defence Council of New Zealand shortly realised that without some form of compulsion the efficiency of the Defence forces, now admittedly much below requirements, could not be maintained. In 1909 the policy of compulsory military training was given effect to in the Defence Act which ensured that every male up to the age of 25 should be trained to defend his country. The Act constituted a force of 30,000 of all ranks, designated the "Territorial" force, and made training obligatory in the Junior and Senior Cadets from the ages of 12 to 18; and from 18 to 21 in the General Training Section. Voluntary enlistment was to be encouraged but the strength of the units was to be maintained from the General Training Section in case of need. Field-Marshal Lord Kitchener visited New Zealand in 1910 and inspected the old volunteer force in its last year of being; the Defence Council ceased to function; and General Godley became G.O.C. at the end of the year.

From the passing of the Defence Act of 1909 the years that followed were a fruitful preparation for War. The New Zealand

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Territorial Medical units were authorised by Gazette dated 6th May, 1910. Military districts were reorganised; A P.M.O. was attached to each district; there were 180 territorial N.Z.M.C. officers on the army list. The first duty of these officers was the examination of cadets and recruits for the Territorial Force.

The registration of all youths available for service had been completed and the G.O.C. reported in 1911 the numbers registered as: Territorials, 21,838; senior cadets, 29,991; which was considered ample, after allowing for rejections at medical examination, for a total establishment of 30,000, the quota recommended by the Imperial General Staff. During the year 1911, 25,085 territorial recruits were medically examined almost entirely by the officers of the N.Z.M.C. Each P.M.O. was made responsible for examinations in his own military district: sub-centres were delimited in each area group with a medical officer in charge who had authority to employ civilian doctors where necessary. Much assistance was rendered by the officers and N.C.O.'s of the permanent staff in charge of area groups. The standard of fitness required was not a very high one as far as the cadets were concerned, as it was considered advantageous that all except those who would be harmed by the training should be accepted in as much as the training was expected to be beneficial. Only the absolutely unfit, therefore, were rejected. The medical examination of the recruits, youths over 18 years of age, was of a more searching character. Recruits were classified as: (*a*) absolutely fit, (*b*) sound and fit for the territorial force, (*c*) those fit only to serve in rifle clubs. Causes for total rejection were: any acute or chronic disease; deformities of bone; scoliosis, if marked; loss of limb; hernia; defective vision; loss of one eye. For service with the territorial force the recruit was required to be in good mental and physical health and free from any physical defect likely to interfere with the efficient performance of military duty. At 18, the standards of measurement were laid down as minimal at: 62 inches height; 111 lbs. weight; 34½ inches chest measurement, fully expanded. The results of the examinations, more especially of the cadets, showed that the standard of physique, as compared with that of school boys of a like age in the United Kingdom, was a very high one, but there was evident an alarming percentage of defects of dentition. The country youths generally gave a higher proportion of fit than the town recruits, but dental defects were more noticeable amongst the country lads. Rejections for defective teeth equalled 120 per 1000. Of the 25,085 territorial force recruits, 657 were classed as temporarily unfit for one year; and 1,350 were rejected as medically unfit for service; equivalent

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to 6 per cent. rejections. Of the cadets examined—26,782—366 were unfit for one year and 889 were rejected: say 3 per cent, totally unfit. 25 per cent. of the rejections amongst the territorial recruits were for physical disablement: diseases of the heart, 16 per cent; defective vision, 15 per cent; defective teeth, 2½ per cent. A special inquiry as to the prevalence of scoliosis showed that little severe deformity presented itself and that about 2.5 per 1000 of the recruits had some degree of spinal curvature.

In the following year, 1912, 3,803 territorial recruits were medically examined, of these 9 per cent. were found permanently, and 3 per cent. temporarily unfit, the chief causes of rejection being similar to those already quoted. It was now agreed that further examination of the cadets under 18 was unnecessary as there were but few boys who would not derive benefit from the cadet training, and the unfit could be readily eliminated. In this year the first territorial camps of instruction were held. The field ambulances went into camp in their own district for company training only; medical equipment was not yet up to full establishment. 3,416 territorial recruits were examined in 1913 with 12 per cent. temporary or permanent unfitness. The Surgeon-General, Colonel Purdy, notes in his report a general improvement in the physical condition of cadets; that there was considerably less sickness in the camps and a marked general improvement in the case of the dental condition. The Adjutant-General also notes that the influence of military training "upon those who had been subjected to it, had been a matter of favourable comment on the part of employers and others in a position to judge." The discipline and conduct of troops in camps was all that could be desired.

The Territorial Force of New Zealand, the New Zealand Army, and first line of defence, was, in 1913, finally organised, fully armed and equipped as a field force of two infantry divisions and four mounted brigades with coastal defence troops and L. of C. troops on modern war establishments. Military training was compulsory for boys from 14 to 18 years in the cadets, and from 18 to 25 with the colours. Service in the reserve extended to the age of 30, but by existing legislation could be increased up to the age of 55 years in case of national emergency. The minimum amount of training required annually was: 31 drills; twelve half-day parades; and seven full days in camp with a prescribed course of musketry. The reserve were required to attend two half day parades or their equivalent with a territorial formation. Promotion to commissioned rank was by examination of N.C.O.'s only—from the ranks—and in the case of officers, by examination and selection.

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The direction and training of the force was in the hands of the New Zealand Dominion section of the Imperial General Staff. Each military district provided a quarter of the total force, namely:—

1 Brigade of Mounted Rifles of 3 Regiments.
1 Brigade of Infantry of 4 Battalions.
1 Brigade of Field Artillery and Ammunition Column.
1 Company Field Engineers, 1 Mounted and 1 Divisional Signal Company.
1 Mounted and 1 Field Ambulance.
1 Company Mounted Supply Company, 1 A.S.C. Company.
Coastal Defence Troops.

General Sir Ian Hamilton, Inspector-General of the Overseas Forces, visited New Zealand in 1914 and inspected every unit of the territorial force; his opinions expressed in his report were: that the progress made during the last three years in giving shape to a national army in New Zealand had been singularly rapid and that there were good prospects of a practical war machine being ultimately produced at an economical price. Of the Medical Corps he advised that the Field Ambulances were organised on right lines; that every use was made of men whose civilian training fitted them to the work. The medical officers attending the camp were enthusiasts and it was obvious that all had benefited markedly in efficiency by the territorial training.

Difficulties there were in plenty in acquiring experience of army requirements: the scattered distribution, more especially of the country units, when one section of field ambulance might be recruited over an area of 50 miles in extent; the limited time that could be made available by busy practitioners for military work; and above all the lack of a qualified, commissioned, whole time instructor from the R.A.M.C. who would have acted as staff officer to the D.M.S. and as an instructor to the officers of the N.Z.M.C. Such an appointment was under consideration. Again, District Medical Staff Officers—the P.M.O.'s—were granted only £50 per annum to cover the expenses of their department, while the D.M.S. had £120. It was felt that the pay drawn by territorial medical officers while in camp was insufficient to defray the cost of a *locum tenens* and that regimental medical officers were obliged to meet expenses and undergo a loss of time wholly disproportionate to the training benefits to be obtained in a battalion camp. These disabilities were not so keenly felt by medical officers attached to medical units, as most of them realised that the experience gained in instructing the men more than balanced the loss of time and money incurred.

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In one way and another, by the use of army manuals, by contact with staff officers and by the effort required in the training of their units, without much encouragement or assistance, the N.Z.M.C. officers prepared themselves for war. A growing number presented themselves for the "C" examination—captain to major—but the number of officers so qualified was a very small percentage of the whole. Above all, the geographical distribution of officers in a sparsely populated country in which they were widely scattered, and the dearth of opportunities for personal communication and interchange of ideas, except in the larger centres, made progress in military knowledge most difficult to attain. There was certainly enthusiasm and a keen desire to carry out all duties assigned with whole hearted energy, but there was a regrettable lack of any effort to organise the N.Z.M.C. in its higher ranks for war purposes. There was no provision for adequate training of the higher commands; the administrative control was weak and inefficient. There were no officers trained for the important duties of direction such as would be required on the staff of the D.G.M.S. in case of war. There were no military hospitals; not even T.F. hospital cadres; there was no department of military hygiene, there were no military laboratories; nor was there any draft scheme to embody these units at the outbreak of war. As far as administration was concerned, New Zealand was not, from a medical point of view, prepared for war. In the words of Sir James Allen spoken in 1915: "No steps had been taken to provide a permanent army medical staff or to organise the medical department, owing to public outcry against excessive expenditure."

Such were the conditions of the New Zealand Medical Services at the outbreak of war in August, 1914, when the D.M.S., then Colonel Will, V.D., who succeeded Colonel F. R. Purdy, T.D., in June, found himself in the necessity of manning and equipping a medical service for expeditionary forces. At that time the strength and distribution of the N.Z.M.C. officers was as follows:—At headquarters, the D.M.S. only, he had no assistant; in districts: four P.M.O.'s, but no sanitary officers as yet gazetted; with 12 mounted rifle regiments, 11 N.Z.M.C. officers attached; to the 16 infantry battalions 19 R.M.O.'s attached; 8 field artillery brigades with 6 medical officers; 8 garrison artillery companies with 7 medical officers attached. The medical units, four mounted field ambulances, and four field ambulances had in all 38 officers. On the army list was shown a total of 153 N.Z.M.C. officers: of these 86 were attached to units; unattached, 67; and there were 3 quartermasters, and, say, 750 N.C.O.'s and other ranks. The present total authorised

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establishment of the eight ambulances was 784 N.Z.M.C. of all ranks, equivalent to 5-7ths of the normal establishment, as the units, in accord with the defence scheme, were not yet fully recruited. There were 66 N.Z.M.C. officers on the reserve of officers and a very small number on the retired list. The New Zealand Branch of Queen Alexandra's Imperial Nursing Service, founded in 1913, with Miss H. McLean as Matron-in-Chief, had as yet no names on its roll.

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CHAPTER II.

Mobilisation and Embarkation.

The Samoan Force.

A telegram received on August 4th, 1914, by our Governor, Lord Liverpool, from the Imperial Secretary of State, intimated that the occupation of the German Wireless Station at Samoa was an urgent Imperial Service. It was decided by the New Zealand Government to send a force to Samoa consisting of: one battalion of infantry; one company of engineers; two fifteen pounders, two six pounders; with signal, medical and army service corps details in two transports: a total force of 1,383. One section of a field ambulance was detailed for this force, with an establishment of four medical officers, two dental surgeons and 67 N.C.O.'s and men; the Senior Officer, Major Mathew Holmes, N.Z.M.C., of the 4th Wellington Field Ambulance, was appointed P.M.O. on the 7th August. To these medical details were added six nursing sisters of the N.Z.A.N.S. It will be seen that the principle of attaching dental surgeons to field ambulances was recognised in the earliest movements of New Zealand troops. There was little difficulty in assembling and equipping the men, even at short notice, as they were drawn from various sections of the 4th Field Ambulance in the Wellington District. Telegrams were despatched to the various Area Groups on the 9th and more than the required number of men had arrived in Wellington the following day. A surplus of N.C.O.'s was enlisted, but they were quite willing to forego rank and pay and joined as privates. A certain amount of extra medical stores was shipped for the purpose of equipping a small base hospital, also material for making first field dressings of which there was no large stock at that time in New Zealand. The equipment consisted of New Zealand pattern medicine chests and surgical haversacks.

The Force, commanded by Col. R. Logan, A.D.C., N.Z.S.C., sailed in two transports on August 15th under escort of H.M.S. *Psyche*, *Philomel* and *Pyramus*, and later the H.M.S. *Australia* and *Melbourne*, and the French warship, *Montcalm*, which met the convoy at Noumea, New Caledonia, on the 21st. They landed at Apia unopposed on August 29th, and a proclamation was made that day by the officer commanding, announcing the occupation of Samoa by New Zealand.

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The health of the troops, on the transports was satisfactory. One inoculation of typhoid vaccine was given during the voyage, but owing to the military situation it was found impossible to administer the second dose until some weeks later. Typhoid was not prevalent in Samoa. Only two men made any objection to the prophylactic inoculation and as they persisted in refusing they were returned to New Zealand without landing. When the transports touched at Fiji, the Chief Medical Officer, the Hon. G. W. A. Lynch, gave the N.Z.M.C. officers much valuable advice and some literature dealing with the recognition and treatment of tropical diseases prevailing, also a small supply of necessary drugs; this was the sum of the information available to the P.M.O. in this important matter of local tropical diseases.

After making his necessary dispositions for medical attention to the troops, the P.M.O. visited and inspected the public hospital at Apia, a well-built structure situated in extensive grounds on an excellent site about one mile from the waterfront. The German civilian staff of the hospital consisted of a chief medical officer, an eye specialist, three nurses, a steward, three Samoan and Chinese dressers with a complement of native servants. There were several departments: a Samoan hospital comprising four native huts; a Chinese ward for 20 patients; and an out-patient and administrative block. The operating section was detached. It was arranged that an empty ward somewhat isolated from the others should be appropriated to the use of New Zealand troops. At first the arrangements between the New Zealand military medical staff and the German civil hospital staff appeared to work smoothly enough. But early in September a severe form of conjunctivitis, endemic in Samoa, broke out amongst the troops; it spread rapidly, it is said by fly contamination, and by the 10th 72 cases had been or were under treatment. On the following day Dr. Schwesinger, Acting-Health Officer, informed the P.M.O. that the whole German hospital staff had decided to cease work and that at 9 a.m. the next morning they would vacate the hospital, which meant that at sixteen hours' notice the N.Z.M.C. would be compelled to take over the whole of the civil as well as the military work. The P.M.O. says in his diary, "one point worthy of notice was that the eye specialist, Dr. Glantz, also refused work and, as some form of eye disease is almost universal amongst the natives of Samoa, we had to anticipate a large amount of extra work, as some 50 cases attended daily as outpatients." Every effort was made to retain the services of the staff, temporarily at least, until an eye specialist could be obtained from New Zealand. The salaries of the staff were

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guaranteed, but without success. The P.M.O. considered that as Dr. Glantz was not acting in a military capacity, he, the specialist, could not be forced to work, although his services were essential. The matter was reported to the G.O.C. and the German staff was deported.

This controversy introduced consideration of a nice point in the law of the Usages of War as sanctioned by the Hague and other Conventions. It is quite clear, from the original instructions issued to the New Zealand Government by the Secretary of State, that the functions of the New Zealand expedition to Samoa were: (1) To seize the German wireless station; (2) to OCCUPY Samoa pending ultimate settlement. The agreement upon which the Laws and Usages of War on land are based make a very sharp distinction between "OCCUPATION" of enemy country and "ANNEXATION." Obedience to the "Occupant" is one of the implied conditions of the special position of the peaceful enemy inhabitants. Enemy surgeons, physicians, and pharmacists, may be called upon to render service in connection with their ordinary vocations provided that they are not compelled to take part in the operations of war, and it is agreed that such specialists should remain on duty to carry on their civil functions for the safety of life and the cause of humanity until duly relieved. The sudden withdrawal of medical and sanitary officials could not but inflict hardship upon the inhabitants of the occupied territory, and it is recognised that such functionaries "best fulfil their moral duty towards their own people if they continue in office in the presence of the Invader." (Laws and Usages of War, para. 395). The P.M.O. says that the vacation of the hospital by the remainder of the staff was rather an advantage, but it necessitated the carrying on of the civil work of the hospital: Samoan in and out patients; Chinese patients; the whole of the civil medical work including the duties of Port Health Officer, the Leper Station, and the town sanitary work. To fill the vacancy in the eye department Major Kendall, N.Z.M.C., Opthalmologist, was despatched from New Zealand and took up his duties on the 27th September.

Improvements in sanitary conditions were carried out as rapidly as possible; war was waged on the flies, prevalent in extraordinary numbers; existing houses were prepared for occupation by the troops during the oncoming rainy season; the floors of Samoan huts were dug up and replaced by concrete. Incineration of excreta was not found to be practicable owing to excessive rains, but by improving existing latrines with concrete floors and instituting a pan removal system operated by Chinese labour a sound conservancy

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scheme was evolved. The sickness rate was certainly high at first: during the four weeks following the landing, 94 cases were admitted to hospital, but with acclimatisation and improved sanitation the sickness rate fell. The principal diseases encountered were the epidemic conjunctivitis already referred to: this, though severe in its onset, resembling somewhat a gonorrheal opthalmia and affecting both eyes in turn, yielded readily enough to treatment with 1 per cent. silver nitrate solution. Cases of permanent blindness amongst the natives seemed to be common, almost all of them suffering from some form of chronic eye disease. Infections of the external auditory canal were also common, stated to have been caused by bites of insects, but were more likely due to bathing in contaminated fresh water; during the first month some 125 cases were treated. A few cases of baccillary dysentery, not of a very severe type, were admitted to hospital. Dengue fever was also noted, but in fewer numbers than was expected, as most newcomers to Samoa are stated to be affected. With the better housing of the men and improved sanitary arrangements the sickness wastage was kept well in hand during October and November.

On the 25th November, 1914, the P.M.O., Major Holmes, was relieved by Major Dawson, N.Z.M.C., and by the s.s. *Navua*, which sailed for Auckland on the 26th, several staff officers including the late P.M.O. returned to New Zealand. In December, 1914, in consequence of the destruction of the German fleet in the Pacific, the garrison of Samoa was reduced. The original Force of Occupation returned to New Zealand, when a relief force of men over the age limit for active service arrived to replace them.

THE MAIN BODY.

The New Zealand Government's offer of an Expeditionary Force for service overseas was accepted on August 12th 1914. Preliminary arrangements were made as early as July 30th for the preparation of such a force as had already been agreed upon by the Army Council in 1913. The composition of the force, afterwards called the "Main Body,"—to distinguish it from the Samoan Expedition the "Advance Party"—was as follows:—

Headquarters.
1 Mounted Brigade of 3 Regiments N.Z.M.R., and 1 independent Regiment N.Z.M.R.
1 Field Troop; 1 Signal Troop; 1 Mounted Brigade Field Ambulance.
1 Brigade Field Artillery with Ammunition Column.
1 Infantry Brigade of 4 Battalions.

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3 Sections, Signal Company, with a Division.
1 Company Divisional Train.
1 Field Ambulance with Dental Surgeons attached.
Veterinary details, Army Pay and Base Depot.

Preliminary notices were despatched, confidentially, to officers commanding districts explaining the system under which volunteers would be accepted, the quota to be furnished by each district, and the conditions of service. Volunteers were to be territorials or men with previous war experience between the ages of 25 and 35 years; the duration of service abroad: the duration of the war, and for so long after as might be required for repatriation. The medical examinations by N.Z.M.C. officers were to be carried out locally at Regimental Headquarters so as to secure decentralisation.

On the 7th August, 1914, the New Zealand Government cabled to the British authorities offering the service of an Expeditionary Force which was accepted on the 12th, when steps were immediately taken to mobilise and concentrate the quotas at the four centres, so that embarkation could take place on the 28th August. The establishment of the Expeditionary Force provided for a Headquarters somewhat similar to that of a division, which included a G.O.C., with an Assistant Military Secretary and one aide-de-camp; a general staff officer, 2nd grade, with one officer attached; an A.A.G., a D.A.A.G.; an A.Q.M.G. and D.A.Q.M.G.; an A.D.M.S. and a D.A.D.M.S. Major-General Godley, C.B., I.G.S., was appointed G.O.C.

Col. W. T. Will, V.D., N.Z.M.C., then D.M.S. was appointed A.D.M.S.; Lt.-Col. P. C. Fenwick, P.M.O., Christchurch, was his D.A.D.M.S. The Field Ambulance was under the command of Lt.-Col. C. M. Begg, N.Z.M.C., P.M.O., Wellington District, and the Mounted Field Ambulance was commanded by Lt.-Col. Chas. E. Thomas, V.D., N.Z.M.C. The total complement of medical personnel provided was as follows:—At Headquarters, 2 officers, 7 O.R. Mounted Rifle Brigade: 3 officers, R.M.O.S.; 4 N.Z.M.C. per regiment for water duties; 12 O.R. in all. One Independent Mounted Rifle Regiment: 1 officer; 4 O.R. The Mounted Brigade Field Ambulance: 8 officers, including two supernumeraries, and 76 N.C.O.'s and O.R. The Field Artillery Brigade: 1 officer; 4 O.R., N.Z.M.C. The Infantry Brigade: 8 officers, one senior officer and one junior officer to each battalion, with 5 N.Z.M.C. for water duties per battalion: making 20 O.R. in all. The Divisional Signal Company and the Field Troop each had 2 N.Z.M.C. attached for water duties. The Field Ambulance had 13 officers—3 supernumerary lieutenants N.Z.M.C.—and 182 N.C.O's and O.R., N.Z.M.C. One officer as

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X-Ray expert: Hon. Lieut. Col. Batchelor, N.Z.M.C. was attached; and one junior officer detailed as medical officer to Divisional troops. Ten dental surgeons with the rank of Lieutenant N.Z.M.C. were appointed. Making, in all, a grand total of 48 officers and 328 other ranks, N.Z.M.C.

The personnel was assembled in groups at each Military District. "A" section of the Field Ambulance was enlisted from details of the 4th Wellington Territorial Field Ambulance; "B" section from the Auckland No. 1 Field Ambulance; and "C" section at Dunedin from the 2nd Field Ambulance and O.T.C. of the Medical School. The Mounted Brigade Field Ambulance was recruited in Christchurch, Headquarters of the No. 6 Mounted and the 3rd Field Ambulances. The N.C.O.'s and other ranks were almost exclusively volunteers from the Territorial Force. The officers were, in the case of the senior ranks, all volunteer officers with long service; some of them had seen active service in the South African war, all had undergone territorial training. There was no cadre of regular officers and N.C.O.'s as in the combatant formations, only one of the N.Z.P.S., the late Captain Quartermaster Sandham, M.C., N.Z.M.C., who had been instructor to medical units in the Wellington District was attached as Sergeant-Major to the Main Body Field Ambulance so that the Medical Service was exclusively territorial and comprised many of the best trained and most efficient N.Z.M.C. officers in New Zealand. The Field Ambulances were concentrated at an early date, the Mounted Unit at Awapuni Race Course near Palmerston North, which afterwards became the N.Z.M.C. Depot for New Zealand, and the Field Ambulance at Epsom near Auckland. The equipment supplied consisted of 1898 pattern panniers. The ambulance waggons were a light pattern of local construction. The G.S. waggons, also of local manufacture, were country waggons bought at the time of mobilization.

Ten transports, the only ships available in New Zealand waters at the time, were chartered by the New Zealand Government and converted into troopships, and before the transports were taken over each was surveyed by a board of officers, including a medical officer, who made recommendations as to the necessary alterations. The troopships differed somewhat from the usual type of British Indian transports; hammocks could not be provided, owing to there being so few in New Zealand, so that tiers of bunks fitted with straw mattresses were erected in the holds; the sanitary appliances were satisfactory, there was one bath per 50 men. No alcoholic liquors except those in charge of the medical officers were allowed on any transport, but dry canteens were established by the New

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Zealand Government on each ship. The allowance of fresh water was limited to three gallons per man per diem, as horses were carried on all the transports—over 300 per ship.

It was anticipated that embarkation would take place at the end of August, but owing to naval considerations it was postponed until the 24th September. After embarkation of troops and horses further instructions were received to delay sailing for some weeks, and the Force did not ultimately take its departure until the 16th October. The postponement gave valuable time for further equipping the Force and was made full use of by the Field Medical Units in instructing and training their men.

The Field Ambulance eventually embarked, less details and horses, in No. 8 Transport, the *Star of India,* the Mounted Field Ambulance in No. 3 Transport, *Maunganui,* with their horses and transport. A detail of Medical Staff and one Dental Surgeon was posted to each of the other transports. The total strength of the Expeditionary Force embarked was 360 officers, 8067 O.R., 3,815 horses. Of the officers and men 6,241 were New Zealand born, roughly 75 per cent. of the Force. All the transports had rendezvous at Wellington and under escort of H.M.S. *Minotaur,* H.I.J.M.S. *Ibuki,* and H.M.S. *Philomel,* the convoy weighed anchor at 6 a.m. on the 16th October, reaching Hobart on Trafalgar Day where the troops were put ashore for exercise in the morning. The ultimate destination, as far as was then known, was Bulford Camp on Salisbury Plain where already a contingent of New Zealanders, then domiciled in or visiting England, were mustering; while a certain number of New Zealand medical officers were already serving with the B.E.F. in France.

On board the New Zealand transports there was little sickness of importance. Inoculations with typhoid vaccine were completed and vaccination proceeded with—only three men refused inoculation, they were returned to New Zealand later. Measles of a mild type was the prevailing disease in the various transports up to the date of arrival at Albany, Western Australia. Opportunity was found here for exercising the troops both ashore and in the handling of the ship's boats. A few sick were disembarked on the 1st November. The Australian warships *Sydney* and *Melbourne* joined the escort and the convoy resumed its journey. Three casualties in the N.Z.M.C. were reported on the voyage to Colombo: during the "Neptune" celebrations on board the *Arawa,* Lieut. Ernest John Herbert Webb, N.Z.M.C. sustained a fracture dislocation of the cervical vertebrae in diving into a sail bath; he was admitted to hospital in Colombo where a laminectomy was performed, but he

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died on the 18th November. A short memorial service was held in each of the transports in memory of this young officer who had been much of a favourite with all ranks during the voyage. Two N.Z.M.C. privates died of disease and were buried at sea. So it was that the N.Z.M.C. was the first unit of the Main Body to make sacrifice of lives in the great cause. No further deaths occurred during the voyage, the health of the troops, with the exception of the limited outbreak of measles, was good. As was inevitable during a seven weeks voyage, several major operations were performed by officers of the Medical Corps: on one occasion the *Maunganui* hauled out of line and steamed head to swell to allow of an acute abdominal emergency to be operated on with the least possible movement of the ship; the patient, a member of the N.Z.M.C. made a good recovery, the operator was Lt.-Col. E. C. Thomas, V.D., of the Mounted Field Ambulance; his last formal operation probably, as he was killed in Gallipoli some nine months later.

Disembarkation took place at Alexandria on the 3rd December and following days; the sick were transferred to Ras-el-Tin hospital. Some inconvenience was caused to the Field Ambulance owing to the fact that their horses were not on the same transport as the men and waggons. The O.C. Field Ambulance comments in his diary as follows:—"the practice of sending the unit horses and transport by another boat has not proved satisfactory; as a result the ambulance had to encamp without tents or cooking appliances." The General Staff diary comments on this matter by stating that the principle of separating the mounted men as little as possible from their horses was observed in New Zealand. The principle should, for many good reasons, apply to mobile medical units, which should be embarked with their horses and transport in the same vessel so as to disembark ready for immediate action as to sick or wounded if required.

It was now decided that the New Zealand Contingent should remain in Egypt as part of the Imperial Force in garrison there and should form the nucleus of a New Zealand Division. For the purpose of increasing the establishment the First Australian Light Horse Brigade with its Field Ambulance and the Ceylon Planters Company were attached. A camp for the Division was formed near Cairo on the edge of the desert astride the Heliopolis–Suez road which ran east and west through the camp. The New Zealand Field Ambulance established a receiving station for 200 sick in the lines, and the whole of the Abasseyeh hospital was set apart for the use of the New Zealand troops; the sick from Ras-el-Tin were transferred to this hospital, New Zealand Medical Corps details

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were posted there from the field ambulances, but at this moment the nursing staff consisted of Australian ladies, members of the Australian Branch Q.U.A.I.M.N.S., of whose service there is much praise in the diaries.

Training of medical units in sectional, company, and brigade operations commenced on the 14th December and went on uninterruptedly until February. The sanitary and preventive measures adopted in the Heliopolis camp conformed with those in use in Egypt. Units were allowed to dispose of kitchen refuse to contractors; the conservancy was maintained by civilian labourers; the latrines were of the open pan type; a water supply was laid on. As regards preventive measures, T.V. inoculations were completed, without many dissentients protesting—those that did, some 35, were repatriated to New Zealand by returning ships. Venereal disease prevention was aimed at by ordering a weekly inspection of officers and men, and the repatriation of all those found to be suffering from syphilis. On the 22nd December the Field Ambulances of the Division, two New Zealand and one Australian, were inspected in the morning by Col. Manders, R.A.M.C., A.D.M.S. in Egypt, and in the afternoon, by Lt.-General Birdwood, C.B., C.S.I., C.I.E., D.S.O., of the Indian Army, now commanding the Australian and New Zealand Army Corps. All the ambulances took part in the spectacular march of troops through Cairo on the 23rd, which inaugurated the establishment of the British Protectorate in Egypt.

The end of the year saw the death of another N.Z.M.C. officer, Captain James Alexander Bell, of the Mounted Field Ambulance, who died at Abasseyeh hospital from cerebral haemorrhage on the 29th. His funeral was attended by representatives of every unit in or about Cairo, and both the G.O.C., Egypt, and General Birdwood were represented, the latter in person. The total wastage from deaths and sickness to the end of the year 1914 was: deaths 6; invalided to New Zealand 17.

Voluntary Aid Societies were now very active in assisting the New Zealand forces. There was not at this time in New Zealand, any provision made for co-ordinating the work of the many "Patriotic" and Voluntary Aid Societies formed in all parts of New Zealand at the outbreak of war, but in the general enthusiasm many offers of gifts, money and services were made from all parts of the Dominion. Quite early in August the "New Zealand War Contingent Association" formed under the auspices of Lord Plunket in London had initiated its benevolent and fruitful work. Other Societies in New Zealand—the Red Cross, St. John's Ambulance Association, the Y.M.C.A., and the Salvation Army—contributed

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gifts, money and personnel for the service of the sick and wounded. Early in October the question of motor ambulance transport for the New Zealand Field Ambulances was under consideration; the Dominion Government acting on the recommendations of the High Commissioner in London, Sir Thomas McKenzie, ordered 14 motor ambulances from England at a cost of £7,000, to be shipped to Egypt on completion. Of these motor ambulances, the "Hawkes Bay" fund, initiated by the local branch of the British Medical Association at Napier, paid for 7; and, in all, 10 ambulances were contributed either by generous individuals or from patriotic funds. Prior to embarkation, certain substantial sums were handed to the officers commanding ambulances for the purpose of contributing to the comfort of sick and wounded, and the British Red Cross Society, New Zealand Branch, shipped with each ambulance bales of extra medical stores, dressings and comforts. Had the instructions been complied with, as set out in Field Service Regulations, part II., chapter XI., paragraph 97, which state that all offers of service gifts by voluntary aid societies or voluntary organizations should (in time of war) be submitted in the first instance to the Red Cross Society, much waste of material and much correspondence to Headquarters would have been avoided. The Ambulance Associations of St. John and St. Andrew are of course excepted from this regulation; their function being mainly the provision of personnel and services as opposed to gifts. But in the general enthusiasm created by the war and the despatch of New Zealanders to the aid of the Old Country all gave with a generous hand without too close a scrutiny of the real usefulness of the gift or its ultimate disposal.

Early in January, 1915, it had been decided that the New Zealand Force was not to be broken up; it was to form the nucleus of a mixed division, to be known as the "New Zealand and Australian Division" which, with the 1st Australian Division, was to form the Australian and New Zealand Army Corps under General Birdwood's command. Instead of the three infantry brigades which normally form the complement of a division of infantry, two brigades of cavalry—the 1st Australian Light Horse Brigade and the N.Z.M.R. Brigade—were substituted so that there were four brigades in all: the New Zealand Infantry Brigade; the 4th Australian Infantry Brigade, with their two Field Ambulances; and the two Mounted Brigades, also attended by their Mounted Brigade Field Ambulances. The Artillery, comprising three brigades and one howitzer brigade, were all New Zealand troops; as were the Engineers and Army Service Corps. The Medical Service was

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mixed: A.M.C. Ambulances and Regimental detachments with the Australian troops; N.Z.M.C. with New Zealand troops. This combination of cavalry and infantry constituted a "Mixed" Division. However imperfect the composition of the Force, the comradeship of the Australian and New Zealand units grew in time into a lasting friendship—a hallowed memory of brotherhood.

The first three months of the New Year were devoted to the training of the Main Body in Egypt—a training of a most strenuous nature shared by the Medical Units. But it was not by field training alone that the Ambulances were exercised. There was a camp "hospital" with 262 patients suffering from infectious and other diseases, and early in January there was a mild outbreak of smallpox (four cases), which necessitated the re-vaccination of the whole Division at the rate of 10 per cent. per diem. So effectual was this preventive operation that by the 14th January no less than 50 per cent. of the Division was temporarily non-efficient by reason of successful vaccination. Colonel Begg, commanding the Field Ambulance, somewhat aggrieved, says in his diary that he had at this time some 44 men detached for duty at Abasseyeh hospital, the remainder mostly engaged in his Camp hospital, and but little time left for field training; although he recognised the importance of the experience in hospital work attained by his nursing orderiies.

The end of the month was destined to give the Commanding Officer some idea of the preparedness for war of the New Zealand Field Ambulance, as he was ordered to entrain for Ismailia on the 26th of January with the New Zealand Infantry Brigade who were to help in the defence of the Suez Canal against the advancing Turkish Columns. It was the eve of the Festival of Mouled-en-Nebi, the birthday of the Prophet, and we may assume that as the Turkish Force did not attack until the night of the 2/3rd February, the German plan was some days behind schedule time. We were in touch with a Force estimated at 12,000 Ottoman troops with field and heavy artillery and pontoons concentrated at some 5 to 6 kilometres distance from the eastern banks of the Canal. Two battalions of our infantry, with two sections of field ambulance and the Brigade Headquarters, were moved to Ismailia to cover the ferry, and two battalions, with one section of field ambulance, to El Ferdan on the Canal bank north of Ismailia. New Zealand troops were detached to Serapeum and as far south as Suez; some medical details attended the detachments.

The main attempt by the Turks to cross the Canal in pontoons eventuated near Serapeum where men of the Nelson Company assisted Indian troops to break up the attack. To "B" section of

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the New Zealand Field Ambulance, bivouacked at Ismailia Railway Station, fell most of the work in tending the wounded, exclusively enemy wounded, as the New Zealand casualties were only one man who died of wounds, and one N.C.O. slightly wounded. The Headquarters section and "C" section were posted at El Ferdan Station where no casualties were reported, but an advanced dressing station under Captain A. V. Short was established 200 yards north of the ferry at El Kubri in the trenches across the Canal.

Gun fire was heard during the day on the 2nd February and in the afternoon heavy rifle fire to the south. Ismailia received a spattering of shells from field guns on the 3rd. The battle was now well engaged, and by 3.30 p.m. Turkish wounded prisoners were being admitted to "B" section's dressing station at Ismailia. Other enemy wounded, too badly hurt to be fit for transport to Cairo, were looked after by our people at the railway station; in all some 81 Turkish wounded prisoners were attended to between the 3rd and the 5th. Major Murray, N.Z.M.C., in his diary notes the "explosive" effect of the modern pointed bullet fired at close quarters with the great destruction of tissue and multiple shattering of bone produced; nearly all the wounds were caused by rifle fire and were severe; there were only two bayonet wounds observed. The method of treatment adopted was: a thorough clean up of the injuries, painting with iodine, and the application of plain sterilized gauze dressings. It had been found, in France, that where a wound was painted with iodine and dressed with the double cyanide of mercury gauze some blistering of the tissues took place owing to chemical action. All troops were originally provided with ampoules of iodine solution, to be used with their medicated first field dressing, but owing to this untoward action of the combined dressing, the iodine was withdrawn and the medicated, antiseptic dressing retained. The German field dressings were plain sterilized, but it was considered more prudent to preserve the germicidal character of the "blue gauze" in the British first field dressing issued to the individual.

When all signs of activity on the Suez Canal front had subsided, the Brigade and the Ambulance, now blooded and a bit heady from their first smell of powder, returned to camp at Zeitoun, the cynosure of all those who had remained perforce behind. Two matters of medical importance were revealed by this minor operation at the Canal: the regimental medical officers were insufficiently equipped with medical stores, and the infantry were short of first field dressings. These matters were promptly attended to. The first field dressing is a part of a man's equipment, as essential as

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his water bottle or his identity disc, but its usefulness was not for the moment much appreciated until the eve of hostilities. For these reasons a divisional order was promulgated on March 3rd that:—All first field dressings were to be stitched tightly to the lining of the special pocket in which they were carried, that great care of these dressings was to be taken, as supplies were limited and it was not possible to replace them.

Brigade training in the early days of March, followed by divisional training in the latter part of the month, brought the field ambulances into more mimic battles, night marches and medical manoeuvres. Six dusty horses hauling ambulance waggons through yielding sand to the old trysting place, the 2nd Water Tower, where to the rattle of side drums signifying heavy machine gun fire "Northland" engaged in severe hostilities with "Southland" or the New Zealand and Australian Division utterly discomfited their old friends the East Lancashire Territorial Division,—"our beautiful East Lancashire Division" of Sir Ian Hamilton,—and artefacted casualties laid themselves down in grateful ease beneath the waggon covers of improvised dressing stations. Field days, night manoeuvres, inspections and grand reviews followed in monotonous succession until the Division found itself at last in that high state of fitness and military efficiency, coupled with exasperation, which imperatively demanded an immediate removal to a more active sphere of occupation remote from the flesh pots of Egypt.

Meanwhile the tally of sick men increased somewhat,—the unfit were being eliminated,—the camp hospital and the hospital at Abasseyeh were well filled; deaths from pneumonia were all too prevalent. 206 men sick with venereal disease were despatched, under escort, to Malta on the 26th. Most of these, young men probably of the very best fighting stuff, trained to the pinnacle of physical fitness and warlike spirit, brought to disgrace by the irresistible temptations of a sensuous oriental city. A heroic attempt was made by zealous New Zealand medical officers to combat the sources of venereal infection by visit and inspection of licensed brothels, and brigade ablution tents were provided, possibly with some success. But the problem of venereal prevention is a thorny subject, so beset by "Moral Considerations" and prudish disdain, so much a problem of the soldier's life and the tempestuous wilfulness and devil-may-care of men, possibly doomed to die, who have been wrought to a pitch of overmastering fitness and exuberance by skilful training for war, as to make it then, now and forever insoluble. The philosophy of Omar ruled the soldier, all were tent-makers in those days when to-morrow they might be

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numbered with yesterday's ten thousand years. The retribution that fell upon the evil places of the "Sharia-el-Banat" on Good Friday, at the hands of the Colonial troops was perhaps not unmerited if it was inexcusable; but it was certainly not an acceptable solution of the problem.

The Division was now complete, ready and fit for anything. Rumours were abroad towards the end of March; a serious operation, overseas, was in contemplation. The two Infantry Brigades, the New Zealand and the 4th Australian with their ambulances and the divisional artillery and engineers with divisional troops were to be embarked in transports for Mudros early in April; the horsemen of the mixed division were to be left behind for the present with the mounted field ambulances. The men of the Medical Corps under Lt.-Col. Begg, who was a most zealous commander and a strict disciplinarian, had been through four months of hard training. They had caught a glimpse of real warfare at the Suez Canal and had obtained valuable and varied experience both in their own hospital in camp as well as the base hospital at Abasseyeh. The many marches in the desert had served to instruct the officers in map-reading and the use of the compass and other matters pertaining to desert fighting. They had learnt by experience the value of sanitary and preventive measures in camps; they were now fully trained and were no doubt in a high state of efficiency for war.

The services of Col. N. Manders, A.M.S., A.D.M.S., in Egypt were placed at the disposal of General Godley, who later appointed him A.D.M.S. of the Division vice Col. Will, V.D., N.Z.M.C., detailed for special duty in England.

Two New Zealand reinforcements, the 2nd and 3rd, brought a quota of N.Z.M.C. officers and men in December and March, Major Mathew Holmes, late P.M.O. of the Samoan force, was in charge of the 3rd N.Z.M.C. reinforcements, which at this time were being supplied at the rate of 2¼ per cent. of the overseas medical troops, per month; a rate which was inadequate to cover wastage and was later increased to 4 per cent. per month. Promotion to captain was granted in March to all lieutenants N.Z.M.C.—including the dental surgeons—who had sailed with the Main Body. Of the expediency of this early promotion of junior medical officers, some of them but recently qualified, there has been much argument. The factors governing promotion were at this time quite simple in theory. The medical troops of the Main Body were enlisted for the duration of the war, no temporary contracts, no temporary commissions made. Each officer was shown on the N.Z.E.F. gradation list, published in Egypt, and his seniority dated from the day of

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his joining the Main Body. Such a system could not prove satisfactory because, in the case of medical officers, professional attainments in themselves constitute a recognised seniority apart from military rank, and a young captain graduated less than twelve months ago could not reasonably be asked to undertake the same duties as a captain on the reserve of the N.Z.M.C. not yet joined up, who was an experienced surgeon holding important hospital or university appointments. The principle was not adhered to, hence further dissatisfaction—temporary contracts for one year were made in later years when the shortage of medical officers became acute, adding to the inequalities of service. The regulations governing the promotion of officers in the N.Z.M.C. were revised at a later date; but questions of gradation presented controversial difficulties even at this early period.

Two medical officers per battalion, one a junior officer, was the authorised establishment at this time. The dental surgeons were distributed as follows:—To field ambulances, 2 dentists—thus the 4th Australian Field Ambulance had 2 N.Z.M.C. dental surgeons attached; and to each mounted brigade field ambulance, 1 N.Z.M.C. dental officer. So keen was the competition amongst dental officers to be allowed to go forward to active service that the A.D.M.S. ultimately consented to a ballot, and by this means the four successful ones were chosen. To No. 1 Australian General Hospital, one N.Z.M.C. dentist was attached, the remaining five were sent to the Overseas Base in Egypt. One medical officer, one dental officer and 11 N.C.O.'s and O.R. were sent back to New Zealand in April in charge of some 75 officers and O.R. invalided. The supernumerary medical officers, nine, in number were posted to the New Zealand Base formed at Alexandria.

Preparatory orders for embarkation were issued on April 3rd. The sick in our field ambulance were transferred to the New Zealand Hospital at Abasseyeh, and those of the Australian units to No. 1 Australian General Hospital, Heliopolis. On 10th April, 1915, tents were struck, the medical equipment loaded on to the waggons, the medical units entraining on the following morning. The medical stores and panniers of the New Zealand units were replenished and overhauled, so that the equipment was brought up to the existing imperial requirements, all save the field ambulance transport, which received special attention. The ambulance waggons —delivery vans converted—which had been brought from New Zealand had been unfavourably reported on by Col. Begg, but alterations to the body so as to adapt them to service pattern stretchers had been carried out by the State Waggon Works in Cairo.

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Stretchers were replaced or obtained on payment from the Government workshop. The horses, 53 in number, brought from New Zealand, heavy and light draft, and riding horses, were a good lot and in fine condition; but in transport, both as regards ambulance and general service waggons, the 4th Australian Field Ambulance was much better equipped than ours. The New Zealand Field Ambulance entrained personnel at Matareah Siding, the transport, at the main station; the operation was completed in two hours, although there were no end-on loading facilities. Reaching Alexandria the same day, they embarked on board the s.s. *Gosler*, a converted German tramp of about 8,000 tons. After moving into the outer harbour certain sanitary defects became so apparent on board the *Gosler*, that, by the advice of the A.D.M.S., sailing was delayed, the personnel disembarking. On completion of the necessary work—cutting extra scuppers in the 'tween decks where horses were accommodated—the troops re-embarked and the ship sailed on the 17th. She carried the Headquarters of the New Zealand Brigade. The 4th Australian Field Ambulance, less transport, sailed in the *Californian* on the 10th with the remainder of the convoy. The *Lutzow* had aboard General Godley and Divisional Headquarters Staff, including the A.D.M.S., Col. Maunders; the D.A.D.M.S., Lt.-Col. P. C. Fenwick, N.Z.M.C.; and the Chief Veterinary Officer (A.D.V.S.) Lt.-Col. Young. The *Gosler* eventually arrived a week late at the rendezvous at Mudros Harbour, where were assembled some 120 ships of all varieties, the battleships, cruisers, destroyers, submarines, of four nations, Britain, France, Russia and Australia.

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CHAPTER III.

The Landing at Anzac.

The military forces now assembled at Mudros consisted of one French and four British Divisions: the 29th Division, Regulars; the Royal Naval Division, a recently formed unit consisting of volunteers; the first Australian Division; the New Zealand and Australian Division, lacking one Brigade of Infantry; and the French Division of mixed Territorials and Senegalese troops under General d'Amade. The M.E.F., comprising some 75,000 officers and men, was about to embark upon the most intricate and hazardous operation in amphibious warfare: a landing against determined opposition. An operation likely to be attended by heavy casualties and one in which the problems of the evacuation of wounded by sea presented difficulties as yet not explored, nor elucidated by previous experience. It is of interest, then, to consider momentarily the medical arrangements made prior to the landing at Gallipoli, which have been the subject of much controversy and ill-informed criticism both in England and in the Dominions. If there is just blame attachable to the medical staff by reason of the partial failure of these arrangements, the N.Z.M.C. surely must be held in part responsible, at least as far as Anzac is concerned, as certain of our officers were in medical charge of the ambulance transports, and our chief medical officer—the A.D.M.S.—was for a time, at least, directly associated with the adoption of the scheme of evacuations. What follows, therefore, is an attempt to set out quite plainly the sequence of events which led up to the formulation of the scheme drafted by the D.M.S., M.E.F., Surgeon-General Birrell, and the Administrative Staff of Sir Ian Hamilton, in collaboration with Sir Roger Keyes, Director of Communications in chief, for the evacuation of wounded of the M.E.F. engaged in the operations at Anzac in April, 1915.

On the 4th of April General Sir Ian Hamilton with the General Staff finally sailed for Lemnos on the *Arcadian*. With the party was Lt.-Col. Keble, R.A.M.C., A.D.M.S to the D.M.S.; Surgeon-General Birrell had remained behind with the D.A.G., Bgr.-Gen. Woodward, making arrangements for the base hospitals in Egypt.

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In the absence of the administrative staff, Lt.-Col. Keble, representing the D.M.S., drafted a scheme of evacuation of wounded for the 29th Division, probably in collaboration with the Director of Naval Communications, Sir Roger Keyes of Admiral de Roebeck's staff. In a combined operation of the naval and military forces such as a landing of troops against opposition, it was an accepted principle that the naval commander should be responsible for and direct all movements at sea, consequently the evacuation of the wounded by sea transport was a matter for naval consideration and direction. Roughly, the Navy was in sole charge up to high water mark in amphibious warfare.

Col. Howse, V.C., A.D.M.S. to the 1st Australian Division arrived in Mudros on the 12th April, and in an interview with Col. Keble, on the 15th, was shown a copy of the medical arrangements for the 29th Division which included: provision of one hospital ship, the *Sicilia* then at Mudros, and one ambulance transport, the B2 *Caledonia*. Col. Howse was advised that he would be required to provide a ship for slightly wounded cases, and medical personnel to the extent of three officers, 20 O.R., from the medical field units under his command, for the purpose of manning the ambulance transport allotted to his division. At this interview it was made clear that, at that time, no medical officer had been appointed D.D.M.S. to the Australian and New Zealand Army Corps. To the Headquarters of each of the two corps of infantry which formed part of the B.E.F. in 1914, a senior medical officer was appointed as deputy director of medical services, his duties being to co-ordinate the medical work of the two divisions which then formed an army corps. So far no similar appointment had been made for the Australian and New Zealand Corps; General Carruthers, who was A.A. and Q.M.G. of the corps, consulted Col. Howse and asked him to draft a scheme of wounded evacuation for the corps. Col. Howse, following the general lines of Lt.-Col. Keble's draft for the 29th Division, submitted a tentative plan on the 16th. This scheme selected a transport (not named) to be manned by medical personnel drawn from field ambulances and equipped with medical and surgical stores supplied by the First Australian Casualty Clearing Station; but Col. Howse considered that such an arrangement was not the most satisfactory. He held that it would be preferable to use the *Osmanieh*—the Constantinople ferry boat—and that personnel should be provided by the 2nd Australian Stationary Hospital then at Mena. He had strong objections to the use of troopships in that they all had horses aboard, and he considered it impossible that they could be adequately

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cleansed in the interval between the time of disembarkation of troops and the reception of wounded. The transport *Clan McGillivray* was ultimately allotted to the First Australian Division.

Col. Manders, A.M.S., A.D.M.S. to the New Zealand and Australian Division arrived in the *Lutzow* on the 15th, and had an interview with Col. Keble, at which it was settled that Col. Manders, being senior, should act as D.D.M.S. to the corps—an appointment which our A.D.M.S. accepted with considerable reluctance. In his capacity as D.D.M.S., he visited General Birdwood and as a result of the conference the corps issued in their operation orders (No. 1) instructions to the effect that:—The hospital ship *Gascon*, for serious cases, was allotted to the corps with two ambulance transports, the *Clan McGillivray*, and the *Seeang Chun* for slight cases; making provision for 200 lying down cases and 1200 sitting up—about 5½ per cent. of the full strength of both divisions. The necessary steps were taken by both A.Ds.M.S. to supply the troopships selected with personnel and stores. The transport selected for the New Zealand and Australian Division, the *Seeang Chun*, had on board the headquarters of the 4th Australian Brigade, Brigadier-General Monash, and the 14th Australian Infantry Battalion. She was a well found ship with a sick bay aft giving accommodation for 30 cot cases; she carried no horses. Three N.Z.M.C. officers and 20 O.R., medical personnel were detailed for duty with this ship, intended only for lightly wounded and a short voyage, of say three days, to Alexandria. Col. Manders issued a very important instruction to the A.D.M.S Australian Division which made provision for a senior medical officer to be appointed, who would act with the naval beach masters at the landing places in supervising the embarkation of casualties; he was to see that wounded were duly classified and that serious cases were sent to hospital ship, the slight cases to ambulance transport, and was above all, to notify General Birdwood's Headquarters on the *Queen* when a transport had embarked her full complement of wounded.

On the 18th Surgeon-General Birrell arrived in Mudros with the Administrative Staff, whose presence Sir Ian Hamilton so much required. The Deputy Adjutant-General, Brigadier-General Woodward, whose duty it was to supervise these medical matters after consultation with Lt.-Col. Keble, and the D.M.S., and scrutiny of the draft of medical arrangements for the evacuation of wounded, expressed dissatisfaction with the scheme on the grounds of inadequancy. He put forward fresh proposals wherein it was specified that five ambulance transports were to be put at the disposal of the Australian and New Zealand corps, and made other

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useful suggestions which included improved facilities for embarkations at the beaches and the provision of stationary hospital personnel and equipment in lieu of details and stores drawn from the field units. With these suggestions the D. of C. I.C. the C.G.S., Braithwaite, and the Q.M.G., Winter, were in agreement. The D.A.G. considered the matter to be one of great urgency and that without some such arrangement it would be impossible, from a medical point of view, to commence serious operations. Sir Ian Hamilton, in his Gallipoli diary, vividly describes the anxieties of his D.A.G. "Woodward, though he has only been here one night, is on barbed wires; his cabin is next the signallers, and he could not get to sleep, he wants some medical detachments sent up post haste from Alexandria, I have agreed to cable for them; and now he is more calm." The landing was to have taken place on the 21st, as originally planned, hence the anxiety of the Administrative Staff.

On the 19th the D.M.S. cabled to Egypt for the extra medical personnel, and ordered the following units to report at Mudros:— The 16th Stationary Hospital; the 2nd Australian Stationary Hospital, and No. 5 Advanced Supply Depot of Medical Stores.

Of these alterations in the medical plans, both A.D.'sM.S., Manders and Howse, had some verbal notification; they were at present acting in accord with the original operation orders of the Australian and New Zealand corps, but they were now informed that the field units would be relieved from duty on the ambulance transports and that their stores would be replaced on arrival of the stationary hospitals. Col. Manders took the necessary steps to supply the *Seeang Chun* with N.Z.M.C. officers, personnel, and one and three quarter tons of medical stores from the N.Z.M.C. reinforcements and reserve medical stores on board the *Seeang Bee* as he strongly objected to depleting his field units. He had been informed that an additional number of transports would be selected for serious and slight cases after the hospital ships had been loaded but he made it clear, in his diary, that he was not satisfied with the arrangements and that there was a want of harmony between the office of the D.M.S. and his own, owing wholly to lack of adequate communication, as the ships *Arcadian*, General Ian Hamilton's Headquarters, and the *Lutzow*, it must be remembered, were half a mile apart and the only means of communication was by pulling boats on a wind-swept harbour, at times so rough as to temporarily interrupt all communication.

On the 21st, the day originally planned for the landing, it was blowing hard and the sea was so rough that transport from ship to ship was not available; the transfer of medical personnel could not

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be completed. The landing was postponed pending improved weather conditions. On that day General Godley, with staff, the Brigadiers and the A.D.M.S. of the New Zealand and Australian Division attended a conference on board the *Minnewaska* (Corps headquarters) General Birdwood's ship, where Admiral Thirsby outlined the full scheme of operations intended to be carried out on Gallipoli, which, as far as our Intelligence showed, would not be without severe opposition. Amongst other subjects the estimates of probable casualties at the landing were discussed. Col. Howse dissented stoutly from the original estimate of 5½ per cent. casualties and also expressed his dissatisfaction with the corps medical arrangements. Col. Manders informed General Carruthers, that: "there seems to be the same mix up as far as the hospital ships are concerned," but the A.D.M.S. was not as yet in possession of the fully drafted scheme of medical arrangements. By "hospital ships" in the above fragment from his private diary, he means ambulance transports for lightly wounded, not hospital ships. He consequently had a long interview with the D.M.S. on the same matter without satisfactory results, as far as he was concerned. Part of the misunderstanding was due to the fact that, owing to the rough weather, correspondence dated the 20th and emanating from the D.M.S. office, did not reach Col. Manders until the 22nd, having passed through "A" branch of Corps where it was delivered at 4.30 p.m. on the 21st. This important document was to advise Col. Manders, acting as D.D.M.S. that the 2nd Australian stationary hospital was at his disposal—on arrival from Egypt—for duty on the *Lutzow* the *Ionian* or other ships he might select for the use of the Australian and New Zealand Army Corps, and that No. 5 advanced Supply Depot of medical stores, due to arrive on the *Himithus*, was placed at his disposal. This message which, had the units referred to been in Mudros harbour, would have relieved Col. Manders in his real anxiety took two days to cover a sea distance of half a mile. This incident demonstrates one of the multiple difficulties of amphibious warfare: variable and often insufficient means of intercommunication. The only question Col. Manders could now ask was: where were the medical units concerned?

Col. Howse with Col. Carruthers visited the D.M.S. in the forenoon in regard to the medical arrangements, and were informed that Col. Manders acting as D.D.M.S. had been communicated with and that he had received full instructions and that the second Australian Stationary Hospital had been cabled for. Col. Howse was still dissatisfied and later reported to Corps that only one transport, the *Clan McGillivray* had been provided for the Australian Division.

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At the time of this interview, Col. Manders was as much in the dark as Col. Howse, as he did not have the instructions referred to by the D.M.S. until 1 p.m. that afternoon, that is after the visit of Col. Howse to the D.M.S.

On the receipt of these belated instructions Col. Manders as D.D.M.S. of the Corps, with General Carruthers the A.A.Q.M.G., again visited Surgeon-General Birrell. During the course of the interview Col. Manders exploded a bombshell by showing to the D.M.S. a letter from General Birdwood, the Corps Commander, representing that he, Col. Manders, would be unable to fulfil the duties of D.D.M.S. Australian and New Zealand Army Corps in addition to those of A.D.M.S. New Zealand and Australian Division. Col. Manders was personally thankful to be relieved of all responsibility as regards Corps medical arrangements and had at heart the satisfaction of thinking that two transports, the *Clan McGillivray* and the *Seeang Chun* were complete with medical stores and personnel. But as a matter of fact the *Seeang Bee* had not yet despatched the medical officers, men and stores, to the *Seeang Chung* owing to rough weather and lack of transport.

The 23rd saw the end of the storm, it was a beautiful day; the Admiral-in-Chief issued instructions that landing operations would take place on the 25th, the transports started to move out of the inner harbour. There was a conference on board the *Lutzow* at which were present amongst other commanding officerss, the A.D.M.S. and D.A.D.M.S., Lt.-Col. Begg of the New Zealand Field Ambulance and Lt.-Col. Beeston, V.D., of the Australian 4th Field Ambulance. The nature of the operation assigned to the New Zealand and Australian Division was outlined: the Division was to form part of the forces landing between Fisherman's Hut and Kaba Tepe with the object of seizing the ridge over which the Gallipoli–Maidos and Boghali–Kojadere roads run, including Sari Bair. The intention was to cut off the retreat of the Turkish forces on Kilid Bahr Plateau and prevent reinforcements from reaching them. The method to be adopted was to land the first Australian Division under a covering party to seize Sari Bair and its main spurs and to put the New Zealand and Australian Division "through them" to capture the second objective namely Mal Tepe, the fall of which would lead to the surrender of Kilid Bahr and the domination of the forts at Maidos. It was anticipated that the landing would meet with a determined resistance.

Col. Manders explained the medical arrangements which were somewhat as follows:—A Casualty Clearing Station would land early on the beach and establish a dressing station at the northern-

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most point of the beach in the vicinity of the landing place. The duty of the C.C.S. was to concentrate and tend the wounded until the tent subdivisions of the ambulances came ashore. It was not considered possible that the wounded could be evacuated by the naval barges and cutters until the fighting troops had been landed. The bearer subdivisions of the two ambulances would land as soon as possible: the New Zealand bearers to the left, the Australians to the right. An officer of field rank would be appointed to command each party. They would take with them medical companions, surgical haversacks and extra dressings. They would group the wounded and remove them to the C.C.S. at dark. Each bearer subdivision was to be strengthened by two tent subdivision officers. One sanitary officer was to land at the first opportunity and report to the Officer Commanding Royal Engineers for water control—he was to carry a water testing case and other apparatus for the purpose; any springs or wells found were to be carefully guarded; the water was to be tested before issue; a party of field engineers was to be landed with well-sinking appliances. Naval arrangements had been made to land as much water as possible by pumping from barges into receptacles on the beach and the divisions were to arrange for their own receptacles for carrying water to the firing line. The evacuations of wounded would be: serious cases to hospital ship *Gascon*; light cases to the *Clan McGillivray* and *Seeang Chun*; transport from shore to ship by navy launches equipped as hospital boats. The old maps, 1.40,000, printed in Egypt were issued to the medical officers and all necessary verbal instructions given. Lt.-Col. Begg returned to his ship, the *Gosler*, and made all matters as clear as he could to his officers. Major E. O'Neil, N.Z.M.C. was to command the landing party of New Zealand bearers, about 120 strong, with Captains Tewsley, Boxer, H. Short, A. V. Short and Mitchell: three bearer subdivision captains, plus two tent subdivision officers as required by the A.D.M.S.'s orders.

As it had been very rough in the harbour it had not been possible to practice disembarkation from boats, which was a feature of the preparation of other units, but on this day the bearers went through the manoeuvre of embarking in rowing boats satisfactorily. Captain Walton, N.Z.M.C. was detailed for temporary duty on the *Seeang Chun*, with one other medical officer. Lt.-Col. Beeston, O.C. 4th Australian Field Ambulance, had similar orders and made similar dispositions except that he was not obliged to detach ambulance personnel to man the *Clan McGillivray*.

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On the 24th the final draft of medical arrangements prepared by the Administrative Staff and signed by Surgeon-General Birrell, D.M.S., M.E.F., was issued to "A" branch and the General Staff on board the *Arcadian*. No copies were sent to the A.D.'sM.S. Australian Division or New Zealand Division. Some interesting points are revealed in this document. The C.C.S. personnel was to be landed at 2 p.m. with as much surgical and medical equipment as could be man-handled; the remainder of the equipment of the C.C.S. was to follow later. Two hospital ships were available: one for Helles, the *Sicilia*, 400 cot cases, and the *Gascon* for the A.N.Z.A. Corps, accommodation, 500 cot cases. Two more hospital ships were to be available on the 27th. The Beach Master, a naval officer, would start at 2 p.m. to evacuate wounded from the shore by means of launches each capable of holding 12 cots—three were allotted to the corps—they were to be towed to the hospital ships. Four ambulance transports were provided: *Lutzow*, 200 serious, 1,000 slight cases; *Ionian*, 100 serious, 1,000 slight; *Clan McGillivray*, 100 serious, 600 slight; *Seeang Chun*, 100 serious, 600 slight. This list, if we include the hospital ship, made provision for transporting 500 cot cases and 1600 slight cases from each division, on an estimated basis of over 16 per cent. casualties for the operation. The *Lutzow* and the *Ionian* were to be supplied later with personnel and stores by the 2nd Australian Stationary Hospital. No. 1 Australian Hospital at Mudros was to be used to receive sick only. It was proposed to evacuate wounded to Alexandria and Malta direct.

No. 2 Australian Stationary Hospital, cabled for on the 19th, arrived this day in the *Hindu*, but was unable to report to the D.M.S. who remained in ignorance of the disposition of this unit. Three R.A.M.C. officers and 20 O.R. R.A.M.C., from the 16th Stationary Hospital boarded the *Seeang Chun* on which they found three N.Z.M.C. officers; 20 O.R. N.Z.M.C.; and extra medical stores. On the arrival of this party Captain Abbott, N.Z.M.C. withdrew with his men as he had been previously instructed that he would be relieved by stationary hospital personnel; but two N.Z.M.C. officers were obliged to remain on the transport on account of lack of boats and rough weather. All sick were put ashore; the transports moved off just after midnight.

On the 25th the O.C. 2nd Australian Stationary Hospital received his orders that he was to provide stores and men for the ambulance carriers. He was unable to comply as the transports had sailed; he was instructed to stand fast; but the naval authorities ordered the *Hindu* to sail at 7 p.m. for Helles. He should have supplied three officers, 20 O.R. to the *Lutzow* and the same to the

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Ionian; one officer and 16 O.R. to the *Clan McGillivray*; and 15 O.R. to the *Seeang Chun*—the latter the only part of the order he was able to comply with as this transport had not yet left Lemnos.

THE LANDING AT ANZAC, APRIL 25TH.

The *Gosler* with the New Zealand Field Ambulance aboard sailed for Kaba Tepe at 9 a.m., preceded by the majority of the transports, passed the mouth of the Dardanelles where the 29th Division was landing under the cover of the guns of the Fleet, and anchored off Kaba Tepe at 3 p.m. on Sunday afternoon. Both A.D.'sM.S. had landed early on Anzac beach, both still in ignorance of the final medical arrangements, both most grievously employed. On the deck of the *Gosler* the bearers were standing to, medical equipment in readiness. The beach landing places were being shelled; the great war ships in rear of the *Gosler* were pounding the distant hills; a few shells were falling into the sea amongst the transports. Presently the destroyer *Foxhound* came alongside—she could take 500 men on her decks easily—Major O'Neil and his bearers scrambled down on board her. Each man had three days rations and a ground sheet to carry besides his usual equipment; number fours of squads carried extra water bottles; each bearer carried firewood and some extra dressings. The bearers and the tent subdivision men parted with careless greetings; things did not appear to be going well on the beach—the situation was obscure—the landing places and the slopes above under heavy shell fire.

From the *Foxhound,* carrying ambulance bearers, New Zealand Engineers and A.S.C., when close in shore the parties transhipped to barges each capable of holding 20 to 30 men. In the tow there were several boat loads, each with an N.C.O. in charge whose duty it was to rally his bearers on disembarkation after parting from the small steamboats. When they parted from the tow the boats became strung out as they rowed towards the beach; there was a strong current running; spent bullets were plopping in the water, there were bursts of shrapnel near the beach; no one was hit. Owing to the set of the current the bearer squads were distributed along the beach where they landed; it took some time for them to collect and reform. There was much to be seen on the beach. New Zealand and Australian dead—many wounded—down the beach to the right the Australian C.C.S. at work in a haze of dust near an opening into a gully—the wounded silently taking the places of those landing from the barges. A small pebbly beach and very crowded, only a cricket pitch in depth, the steep face of the shrub covered hills springing up straight from its landward edge. Above was incessant rifle fire and the smoke of shrapnel bursts; noises, dust, and strange

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foreign odours—there was wonderment—there was confusion. The Otagos and two companies of Canterbury were landing, simultaneously in scattered platoons, all up and down the beach.

Major O'Neil was in the first boat to land, with him was Capt. A. V. Short, and part of the bearers of "C" section; as his bearers were not all landed, he left an officer on the beach to collect them, and soon located Col. Manders near Divisional Headquarters, who at once despatched him and all available bearers up the hill to what was later known as Plugge's Plateau. The bearers moved in squads; it was a steep ascent; wounded were dribbling down the slopes under shrapnel and rifle fire. On the way up one of our corporals was hit. Major O'Neil, finding it impossible to establish himself on the plateau where there was heavy rifle fire and no shelter, formed his wounded collecting post in some dead ground at the edge of the plateau at the seaward and N.W. extremity, while the bearers went out in parties of two to search for wounded. Here O'Neil met Bgr.-General Walker, D.S.O., an officer of General Birdwood's staff, now temporarily in charge of the New Zealand Brigade, replacing Bgr.-General Johnson, disembarked sick with measles at Lemnos. It was now six o'clock. There were three battalions of the New Zealand Brigade ashore: part of Canterbury, on the left, badly mixed up with Auckland; Otago had just come into position on the right, feeling for touch with the 3rd Australian Brigade, the advanced party of the Corps which had first cleared the beach before sunrise. They were in desperate straits at the head of a steep gully, to which they had been driven back fighting. The New Zealanders were protecting their left flank and attempting to link up with them, but a deep ravine lay in front of the plateau. Canterbury and Auckland had many casualties; Otago 30 by 6 p.m.

The A.D.M.S. had landed from the *Lutzow* at 10 o'clock with Divisional Headquarters, which were established in a small gully leading up to the plateau, afterwards known as Headquarters Gully. The fighting troops had landed irregularly, now from one transport, now from another. As each platoon or company came ashore it was rushed into the firing line in support of the First Australian Division on the ridges S.E. of a long gully, afterwards known as Shrapnel Gully, which divided the position by its rugged steep-sided cleft running in a north easterly direction. The result of this confused landing was that the units became hopelessly mixed up; the wounded of both divisions, commingled, streaming down mainly in the centre and left flank of the position.

Col. Manders had made two attempts to get a signal through to the D.M.S. on the *Arcadian*. His first message despatched at

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2 p.m. reads: "Wounded arriving rapidly, about five hundred. Probably require another hospital ship. Request ships make nominal roll wounded, impossible here." To this there was no reply. There could be no reply. The D.M.S. was isolated. He had sailed in the *Arcadian* at 5 a.m. for the Dardanelles. He found no means of communicating with the shore during the forenoon; the *Arcadian* was shunted to Tenedos in the afternoon. All signals from the shore were conveyed by the wireless station close to Ari Burnu Point direct to *Queen Elizabeth,* where Sir Ian Hamilton had part of his headquarters. There was no means of communication. There was no D.D.M.S. at Corps Headquarters in the *Minnewaska*—General Birdwood's Headquarters—and had there been, it is doubtful if in the heat of a confused and desperate amphibious battle, with its appalling difficulties of inter-communication, whether A.D.M.S. and D.D.M.S. could have had personal touch by signal. Fighting had to come first; the collection and evacuation of wounded would proceed according to plan. No D.D.M.S. had been appointed to fill Col. Mander's place.

With the approval of the Beach Master, a senior naval officer, acting on the D.M.S.'s medical arrangements, wounded after 2 p.m. were permitted to re-embark on the barges bringing fighting men. The launches for cot cases were plying to and from the hospital ship embarking wounded at a point close to the station of the 1st Australian C.C.S.—Lt.-Col. Giblin, A.M.C. commanding—who had wrought manfully in blood and sweat from an early hour, but were now dangerously congested. In the afternoon all the wounded were not passing through this station; evacuations were taking place in barges at the northern end of the beach, consequently all classes of wounded from the most severe to the insignificantly trivial were boarding the transports irregularly and untallied. The *Seeang Chun,* the headquarters of the 4th Australian Brigade, and one battalion still on board in reserve and not yet ordered into action, was taking in wounded at 6 p.m. The R.A.M.C. and the N.Z.M.C. officers set to work with a will. The heavily equipped fighting men cleared the decks as best they could to allow the stretcher cases to come aboard "painfully and slow." No stretchers were returned to the shore, the wounded lay and were dressed on the decks, not moved from their stretchers as they came aboard. The *Lutzow* also had a considerable number of wounded by 6 p.m. and, as we have seen, was as yet without medical personnel or stores. Here the Chief Veterinary Officer and one N.Z.M.C orderly did all that they could right willingly: Major Young with his morphia and hypodermic syringe; the orderly with the water bottles—two men, amongst many wounded, who tried to help as best they might.

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But to return to the shore. The remaining parties of bearers of the New Zealand Field Ambulance soon got into touch with Capt. Craig, R.M.O. to the Auckland Battalion, close to the wireless station at the northern end of the beach, near Ari Burnu Point. This hardworked officer had established his R.A.P. earlier in the day, near Walker's Ridge, but was ordered to form a collecting post on the beach by the A.D.M.S. and to evacuate his wounded to the First Australian C.C.S. near "Hell Spit." After 2 p.m. he got several tows of wounded away from a point opposite his Post, with the approval of the A.D.M.S., as the C.C.S. was overcrowded, and the carry was long—about half a mile—the beach very congested at the southern end. At dusk, the anxieties of the A.D.M.S. increased; he set the remaining field ambulance bearers under Captain Tewsley to work clearing the beach from the north end and despatched another message to the D.M.S. timed 6.45 p.m.: "To which ship shall now send further lightly wounded?" At Capt. Craig's post there were many wounded lying on stretchers. They had received attention, were dressed and ready for evacuation. One of them, an officer of the Auckland battalion, greeted the bearers:—"My God we are glad to see you fellows—there are hundreds of wounded chaps up on the hills." Barges were being towed in by naval launches, by the A.D.M.S.'s orders. Our bearers loaded these barges which were ill adapted to taking stretchers; as fast as the barges came they were filled up; but it was soon noticed that no stretchers were returning; the bearers bringing down wounded from the hills required to be supplied with stretchers in return. A corporal and an orderly were sent out with one barge to bring back the stretchers. Neither stretchers nor men returned: the men had been seized for duty on some ship lacking medical personnel. The A.D.M.S. personally controlled this embarkation, knowing that by now the C.C.S. was hopelessly overcrowded and overworked.

Through the early hours of the night, Major O'Neil, now reinforced by his bearer officers and men, worked his parties to right and left of the plateau, some reaching Walker's Ridge where the Canterbury companies were, others, Shrapnel Gully to the right; many wounded were found and brought in, most of them in their shirts and trousers only, as during the warm day they had fought without their coats or packs, which had been thrown off on the beach. It was found impossible to make out tallies for many of these men, as the bearers could not use the bull's eye lanterns—which they carried for this very purpose—without drawing fire; and snipers were everywhere, even within our lines. Morphia was given

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by the mouth, improvised splints made of the rifle and bayonet were adjusted with triangular bandages. Water was scarce, especially in Shrapnel Gully, the large water bottles were soon exhausted; the wounded were thirsty. The canvas troughs brought ashore earlier by the troops were useless, they were most of them riddled with bullets. Our bearers led by Capt. A. V. Short, Capt. Mitchell, and Capt. Boxer, did good work that night on Plugge's Hill, and in the gully; the bearers worked hard, many on their own initiative. But the carry from the head of Shrapnel Gully to the beach was difficult on account of steep ground and as yet untrodden ways closely cropped with thick set scrub, where it was hard to see a wounded man lying down. It was a cold night and dark, a little rain fell at intervals. It took two hours to get down from the hill sides to the C.C.S. Major O'Neil, at his collecting post, was able to tally most of his cases; water was carried up from the beach in kerosene tins which had been landed earlier for the use of the infantry.

There was terrific rifle and machine gun fire all night. All was confused. There was deep anxiety amongst the senior officers; the military situation was dangerous, uncertain. Evil rumours filled the gullies and the beach; some men whispered: "Failure"; others talked of evacuation! As yet there was no artillery to support us beyond one Indian mountain battery and one field gun, while the Turks had the best of the position, and dominated ours. Their artillery, posted out of reach of the naval guns, was well manned, well served with an abundance of ammunition and doing deadly execution on our exposed positions. There had been some delay in getting troops ashore, a strange hiatus in the landings between 12.30 and 4 p.m.—precious hours wasted. The *Itonus* carrying the Wellington Battalion under Col. W. Malone left Lemnos two hours late, the battalion did not land until nightfall and was not engaged that day as they were in reserve.

There were estimated to be 1,500 casualties from the Corps at midnight, most of them taken off by 11.30 p.m.; the prepared ships were full; the hospital ship *Gascon* sailed at midnight with 500 wounded aboard.

At midnight was held a momentous conference of leaders: the question of reembarkation was under discussion; the Admiral, the G.O.C. Sir Ian Hamilton himself, were consulted; the position of the Anzacs was very precarious indeed; but it was finally determined that Anzac should stick it out and dig in for dear life. This uncertainty, this doubt—well founded—as to the security of the position, shared by the highest command, was in itself one of the

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causes that led to the hasty and somewhat haphazard evacuation of wounded; the thought of leaving helpless men behind if the Force re-embarked in a swirl of murderous fire was hateful to those who by their profession were bound to do all they could for the wounded.

In the early hours of the 26th reinforcements were landing: the 4th Australian Brigade had one battalion, the 15th, ashore by midnight, and fresh eager men were hurrying up to the dangerous posts at the head of Shrapnel Gully. Wellington and Otago had not as yet been seriously engaged—Auckland and Canterbury had borne the brunt of it—so everybody fell to accordingly, even the field ambulance bearers found themselves entrenching tools, and they dug, dug, dug as Sir Ian Hamilton advised them against the shrapnel in the morning. Before the dawn, there was a lull in the fight; and if our morale was shaken, if our men were exhausted, so clearly was the Turk, possibly, as history suggests, more so. A few of the bearers on the beach snatched a little sleep, only to be wakened as daylight was breaking by the landing of two New Zealand howitzers. A sergeant of the Medical Corps on rising found that he had shared the blanket of a dead man; the latter part of the night was bitterly cold.

THE LANDING APRIL 26TH. SECOND DAY.

Major O'Neil reported early in the morning to Brigade Headquarters and got into touch with Capt. Craig's R.A.P. and with Capt. Baigent, N.Z.M.C., R.M.O. to the Otago Battalion. Craig was to the left with Canterbury, Baigent on Plugge's Plateau. The enemy's guns opened fire early, but the *Queen Elizabeth* came up with Sir Ian to lend a hand and silenced them for a while with gargantuan shrapnel. With confidence renewed by this wonderful display, an attempt was made to reorganize even though the battle was again hotly engaged. Canterbury, Auckland and Otago with some part of Wellington were in the firing line, the 15th Australian Battalion having a "fierce time" up at Quinn's.

Down on the beach near Ari Burnu just north of the Headquarters Gully, Capt. Tewsley had established a post, its back to a clay bank which afforded some shelter; here, wounded coming in from our left round Ari Burnu were being tended. Much trouble there was from snipers' fire at Ari Burnu point; wounded being killed with the regimental stretcher bearers until 10 a.m. when our howitzers got the range and silenced the snipers. Wounded came into Tewsley's post during the day by the beach track around the point from Walker's Ridge, named after Brigadier Walker, then temporarily commanding the New Zealand Brigade; but embarka-

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tions from this part of the beach were difficult, in the morning by reason of snipers' fire from the left, in the afternoon by heavy shrapnel fire directed from Kaba Tepe.

Very early in the morning Col. Manders had despatched a signal message to the D.M.S.:—"Re previous message, to which ship should further serious and lightly wounded be sent." It does not appear that any reply was received to this message—frankly, the D.M.S. was completely cut off from any co-operation in the medical arrangements. He had asked, on this day, that he or his A.D.M.S. might be allowed to join General Headquarters on the *Queen Elizabeth* in order to supervise the evacuations which he considered were not being carried out in accord with the plans agreed upon. A reply to this request came from G.H.Q. to the effect that they were making all necessary arrangements in accordance with the D.M.S.'s plan. During the day a naval surgeon had been put aboard the *Lutzow* where there were over 300 wounded, now 17 hours without medical attention. The medical personnel and stores to man this ship were aboard the *Hindu*, lying at anchor off Helles. The officer commanding the 2nd Australian Stationary Hospital, whom we have seen arriving late at Mudros was still awaiting orders from the Vice-Admiral. He was, of course, powerless to move in the matter as the transports were not allowed to use their wireless plant. The *Itonus* and *Ionian* were receiving wounded during the day. On the evening of the 26th there were about 500 wounded aboard the *Seeang Chun;* her original anticipated capacity was 100 cot, 600 walking cases; she had sufficient medical personnel and stores, as we have seen that two N.Z.M.C. officers with stores had boarded her in Mudros Harbour. General Carruthers came aboard about 6 p.m. and ordered the two N.Z.M.C. officers, Captain Walton, the senior, to report with stores to the *Lutzow*. This was done, so that there was at least no shortage of medical stores aboard the *Lutzow*, although of orderlies there was but one.

In the forenoon the A.D.M.S. visited O'Neil's post. He expressed admiration for the work so far done by the ambulance, and the arrangements made by them; but in the evening he took to his diary for consolation and wrote hard words about the seaward people. He had been keenly opposed to the making of the base at Alexandria; his opinion was that the prepared transports should unload wounded at Lemnos so as to be constantly available. The journey was one of only a few hours from Anzac as compared with three days to Alexandria. He says, "We have about 2000 wounded up to date. The first night

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we filled all the prepared ships and got the last of the wounded off by 11.30 p.m. The general gave the bearers high praise, and they deserved it." The casualties in the corps were 500 to 600 for the second day of the landing; and during the night many wounded passed through the beach station, but the night was quiet enough on the whole. Trenches were being deepened and water was now being carried up the gullies by donkeys and mules landed the previous night.

THIRD DAY OF THE LANDING, APRIL 27TH.

By the 27th the whole of the infantry of the New Zealand and Australian Division were in the firing line or support; a battery of New Zealand field artillery had been landed. The 4th Australian Brigade was on the right of the New Zealand Brigade, the points held being from left to right: Walker's Ridge extreme left, next in sequence, the Neck, Plugge's Plateau, Pope's Hill, Quinn's Post, and Courtney's Post, the three last named had access from Shrapnel Gully on the right. Some units of the Australian Division were still mixed up with our division, but the line was somewhat more stabilised. A very stormy counter-attack by the Turks developed at 9 a.m. on our left. New Zealand Brigade Headquarters warned Major O'Neil of the situation and shortly after he had orders from the A.D.M.S. to move at once to the foot of Walker's Ridge. This he did, with two bearer sections, passing round Ari Burnu point, eventually taking over a station which had been used by Lt.-Col. Peerless, V.D., R.M.O., Canterbury Battalion, on the 25th. It was a sheltered cleft at the foot of Walker's Ridge, just north of the "Sphinx" a prominent detached rock near Russell's Top. Lt.-Col. Peerless, who had been hardworked here since the 25th—casualties in his battalion for the first day alone were 20 killed, 89 wounded, 101 missing—on the arrival of the field ambulance promptly climbed to the ridge to establish a new R.A.P. closer to his battalion headquarters. There was heavy rifle fire on the ridge above. The approach was up a precipitous cliff side, by a very narrow, rough goat track which admitted men in single file only and led to a zig-zag trench about two feet wide. It was, as may be imagined, exceedingly difficult to clear wounded by this, the only available track. Not far from the top O'Neil's party got into touch with Major McKillop, N.Z.M.C., R.M.O. to the N.Z.E., and later, with the R.A.P. of Major George Home, N.Z.M.C., R.M.O. to the Wellington Battalion, which was holding a front of 500 yards and hotly engaged: their casualties were 17 killed, 105 wounded, during that day. There was heavy rifle and machine gun fire most of the day on the ridge. The field ambulance bearers experienced great difficulty in clearing

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the wounded: there had been some rain during the night, which made the track exceedingly treacherous; the wounded had to be carried down on improvised stretchers made of rifles and putties, or lowered or glissaded down on oil sheets. The field ambulance parties had valuable assistance from all R.M.O's and their water duty men who were assisting, of these, Cpl. Singleton, N.Z.M.C., with McKillop and Cpl. Steedman, N.Z.M.C. with Home, particularly, were conspicuous in getting the wounded out of the shallow trenches at considerable risk. Both corporals had the D.C.M. for this work.

At the advanced dressing station where O'Neil was established, the wounded were dressed, splinted, and given a drink, the water supply being maintained by parties of water duty men and other carriers who brought it round from the beach in kerosene tins. No sources of supply, natural or other, were available at the foot of Walker's Ridge. From O'Neil's post it was possible to carry wounded to the landing places via Ari Burnu Point, about three quarters of a mile distant; the going was heavy in loose sand; there was much snipers' fire and some shrapnel to be faced near the projecting point, so much so that the bearers removed their white brassards—as they believed that the Turkish marksmen paid little respect to the Red Cross—which made the stretcher bearers conspicuous and a better mark. One wounded man was shot on his stretcher while rounding the point. Near the point of embarkation, Capt. Tewsley's post already established, took over the wounded and embarked them in barges during the day. There was heavy shelling on the beach from 2 p.m. to 9 p.m., many wounded passed through the collecting post.

Sometime in the afternoon, between 2.30 and 5 p.m. Col. Manders sent the following message to D.M.S., M.E.F.:—"*Lutzow* filling up rapidly. Request name of next hospital ship. Where is advanced depot of medical stores? Running short of supplies." But to this the D.M.S. was unable to reply, it is doubtful if he had the message until two days later. He was off Helles in the *Arcadian* and found it impossible to communicate with the shore or with divisions, although he knew by now that the General Staff of Headquarters were still supervising the evacuations and had despatched five Australian transports to Alexandria without his instructions or supervision, and that his fully matured plans were not being adhered to. The whole of the Administrative Staff of G.H.Q., M.E.F. were also on the *Arcadian* and quite unable to assist, although the evacuation of wounded was part of their duties, not the duty of the General Staff. The *Lutzow* left shortly after 5 p.m.; she had a sufficient supply of medical dressings and drugs; Capt.

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Walton, N.Z.M.C., and with him one other N.Z.M.C. medical officer, was aboard, but they were short of orderlies and of nursing apparatus, and the ship carried 160 horses. Several deaths took place during the voyage. The medical officers, of course, worked like slaves, and all hands did what they could with the 500 wounded they carried.

The total casualties for the corps were 500 for this, the third day. During the first three days fighting, the New Zealand and Australian Division lost 17 officers, 224 O.R. killed, 35 officers, 655 O.R. wounded, the missing not recorded: a total casualty list of 931. The losses of the Anzac Corps were 3000 approximately in the same period: say 15 per cent. of the force engaged.

The 28th was a day of reorganization and consolidation. There was no marked military activity save the now usual shelling of the beach—even that horror somewhat abated. The A.D.M.S. was now most anxious to land the tent subdivisions of the ambulances and he took steps to have them disembarked. The tent subdivisions of the New Zealand Field Ambulance on the *Gosler* had opened a dressing station on the 26th. Many wounded were coming aboard; the hospital ships and ambulance transports were inadequate to deal with all casualties. No doubt in the unavoidable confusion of the first few days many trivial cases boarded the prepared transports, so encroaching on the accommodation available for stretcher cases; as the result, barges carrying wounded drew alongside any transport where there was a chance of quitting their pathetic cargo. There was considerable delay and difficulty in getting stretchers up the companion way of the *Gosler*, although fortunately the sea was calm as it had been during the previous days. An operating table was set up in one of the larger cabins and at least one amputation performed. Blankets were provided from the G.S. waggons in the hold, and the stretchers were placed on the top deck under cover of the awnings. The wounded were New Zealanders and natives of India. Shortly after mid-day on the 28th the tent subdivision had orders to disembark. All equipment, with the exception of tents, ground sheets and blankets, was brought safely to shore towards dusk. Tewsley's party handed over their collecting post and rejoined the A.D.S. under O'Neil, and here, with its back to a clay bank, the M.D.S. was established, the party during the night excavating and filling sand bags so as to make some sort of shelter from shrapnel. Evacuations proceeded satisfactorily during the day: again there was a loss of between 400 and 500 in the Corps.

The 4th Australian Field Ambulance bearers had been working assiduously in Shrapnel Gully in rear of their brigade since the

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25th, and were exposed to unusual hardships. Their main dressing station opened the same day as ours at the mouth of the gully. Lt.-Col. Begg opened at 7 a.m. on the 29th,—his admission and discharge books date from this day—prior to this no records had been kept by the ambulance bearers. The M.D.S. was partly dug in and had sandbagged walls; a large "tortoise tent" or waggon cover of South African pattern brought from Egypt—where it had been used during manoeuvres as a temporary shelter for personnel and fictitious wounded—now came into action as a roof for the dressing station. In the centre stood the operating table, a "stationery" box with a stool formed the admission and discharge department; on the south side there was a small dug-out for the medical officers, and the cooks had rigged up a kitchen where food could be prepared for the wounded.

The enemy fire was slackening off, the military situation was somewhat improved. Part of the Royal Naval Division was landing. ANZAC had come to stay. And as the diarists all said—there was beautiful bathing on the beach.

We are now in a position to close our reflections on an exasperating problem: the evacuation of wounded in amphibious warfare. There was nothing much in military history of similar operations; in the "Manual of Combined Naval and Military Operations," dated 1913, we will find little to guide us in the matter and only this much information bearing on the point:—

(1) The naval authorities control all operations at sea and up to highwater mark; the military, all shoreward matters beyond. The navy is responsible for communications from beach to shore and all intercommunications at sea.

(2) In drawing up detailed orders, the chief staff officers of the naval and military commanders must work in close consultation, as the slightest divergence of military and naval orders may imperil the intimate co-operation which is vital to combined manoeuvres.

Owing to the difficulty of transmitting orders at sea, naval and military orders should be drawn up at such a date prior to embarkation as to allow sufficient time for completion of the necessary arrangements. Orders for the disembarkation of troops should include:—"medical arrangements."

(3) If the landing is opposed, the wishes of the military commander become of paramount importance.

(4) Hospital ships and ambulance transports are under the command of the naval authorities.

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Combined military and naval operations involving a landing of troops against armed opposition are the most difficult of all warlike manoeuvres and have rarely proved successful. Coupled with the dangers to be faced from the opposing military and naval forces, are the elemental hazards of the sea, unfavourable weather conditions multiplying the risks enormously. These dangers were faced at Anzac and overcome: the forces intended to disembark did disembark without crippling casualties; guns horses and mules were beached, and mountains of stores, to scheduled time. This in itself was an "unparalleled feat of arms" and seamanship. Twelve hours storm during these anxious days would have led to irretrievable disaster; the luck was with the landing parties. But above all the evacuation to transports of over 3000 wounded, simultaneously with the landing of fighting troops on a shell swept beach, and in an open roadstead was a feat for which the navy deserves the highest commendation. That the wounded should suffer was, and is inevitable. That there was hardship, discomfort, real suffering and loss of life caused by the unsatisfactory provisions made for some of the temporary hospital transports is true. Adequate provision of available transports was made in the final scheme of medical arrangements, for deck space, personnel and stores, and had these medical arrangements been carried out in full, much of the hardships and dangers for the wounded would have been eliminated. The causes which contributed to the partial failure of the scheme were:—

(1) The peculiar hazards and uncertainties attending on all combined operations;

(2) The difficulties of adequate intercommunication from ship to ship, and ship to shore, even in harbour;

(3) The especial difficulty of evacuating wounded from a beach exposed to shell fire in barges often not suited to the purpose and more especially the classification of these wounded, the sorting of them and the direction of the barge loads of such sorted cases to the transports selected for their special reception.

The 1st Australian C.C.S., landed on the 25th, did magnificent work as a dressing station, but could not exercise its normal functions as a casualty clearing station as we now understand them; neither could the small advanced dressing stations of the bearer personnel keep even a nominal roll of the wounded they collected and dressed and helped to evacuate.

There is little doubt that had the *Hindu* been in touch earlier much could have been done to equip the transports

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selected with adequate personnel and stores. And it is also certain that had the D.M.S. and the administrative staff of Sir Ian Hamilton's Headquarters been in a decisive position to direct these operations,—and it is not an unreasonable expectation that they should have had facilities for carrying out their most important functions,—most of the depressing and nauseous scandals of the evacuation would never have tormented the ears of the distracted friends, relations and fellow citizens of the sufferers in England and the Dominions, remote from the war, cut off from reasonable information by the censorship, and a prey to all the anxieties of uncertainty. But for reasons which form part of the hazards of combined operations and the attendant difficulties already outlined, the *Hindu* remained "Missing." Owing to the restrictions placed on the use of wireless she was unable to communicate with the responsible naval authority and remained on the high seas off Helles without instructions until the 29th, when she arrived at 7 p.m. off Anzac distributing her precious stores, officers and men to various transports on the following day. The D.M.S. comments in his diary, "the Anzacs wired they wanted dressings. Unfortunately the *Clan McGillivray* and *Seeang Chun* which had large stores had left for Alexandria without [my] orders." He also infers that the classification of the wounded seems to have been wanting in spite of beach officers having been notified that certain ships were for very slight, others for serious cases. A trawler was supplied to the D.M.S. on the 29th; Lt.-Col. Keeble went round the transports and reallotted wounded to ships according to classes.

With regard to the classification of wounded ashore: we have seen that Col. Manders in his orders had detailed an officer for this purpose but he cancelled the order when he ceased to be D.D.M.S.—we have seen also that both A.D'sM.S. in person, worked on the beaches prior even to the hour appointed for the first evacuations at 2 p.m. But having in view: the overcrowding of the C.C.S. and the initiation of evacuation from another point further north out of control of the C.C.S., the distance seaward at which the transports had to anchor on account of shell fire, and the anxiety to get wounded off as night fell, due to general tension and uncertainty as to holding out in the very insecure positions attained, it is impossible to suggest that anything better could have been done by the shore parties. Everyone praised their work.

Whatever the extent of the failure of an almost impossible and unprecedented feat of evacuating wounded from a hotly

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contested and still doubtful landing, the unholy revelations that followed had disadvantageous results on the fortunes of the Expedition. A too ready acceptance by accredited and private investigators of the tales of broken men led to the general publication of crudities and indelicacies better withheld. Only the sordid and nauseous incidents were recalled, not the fact that human energy had been expended to the utmost in an attempt to help the wounded, and that a glowing page of something achieved had been inscribed in the annals of our Empire's amphibious wars. At least, the gratitude of those taken off from the accursed beach, obsessed by a dread of mutilation by the Turks had they succeeded in driving us back to the boats, must be set in the credit column of this account of profit and loss. That this wholly unreasonable fear of maltreatment should have existed amongst the wounded is inexplicable, because the Ottoman soldier was always irreproachable in his adherence to the Geneva convention, tales of snipers and the Red Cross apart—fishermens' tales mostly—nevertheless it was a curious belief of the Anzacs at least in the early days of the landing. The wounded did not care much how they got off so long as they were shipped away from the beach, and they accepted the hardships they had to bear manfully; but as their wounds grew cold and the long hours drew out on the voyage to Alexandria, there was much discomfort; much suffering. The conclusion arrived at by the Dardanelles Commission in their final report affirmed that: "Though a great deal of discomfort amounting in many cases to actual suffering was occasioned to the wounded by the deficiency in medical attendance and the want of proper medical appliances on board the transports, we think that the evidence is that the loss of life in consequence was small," and a little later it is stated:—"We think that many of the difficulties might have been avoided if a general plan of the operations had been carefully worked out before the Expedition was undertaken." General Sir Ian Hamilton in his first despatch accepts responsibility for all plans devised by his general staff, who, in the absence of the administrative staff made all the elaborate arrangements for the landings; but no Anzac has ever, or ever will, accuse Sir Ian of default.

One more document we must examine before we dispose of this consideration: it is a copy of a signal message dated 28.4.15 from the A.A. & Q.M.G. Australian and New Zealand Army Corps to General Birdwood. It is signed by Brigadier General Carruthers:—"I yesterday organised the hospital trans-

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ports, put medical officers and equipment on board and despatched them to Alexandria. The following vessels carrying about 2,800 wounded have left. *Lutzow, Itonus, Ionian, Clan McGillivray, Seeang Chun.* I have had to disorganise the field ambulances somewhat to get the medical officers and equipment. The wounded are very uncomfortably housed and the attendance is insufficient and the drugs scanty, but no more was possible. The *Hindu* with the stationary hospital equipment has never come at all. I have given all the transports orders to return as soon as possible and have told the medical officers to select and bring back any men slightly wounded who are fit to rejoin the ranks. Hold parties and military transport staff have in most cases stayed on board. As the doctors have no medical attendants the hold parties are doing the work."

As regards the *Lutzow*, Captain Walton, N.Z.M.C., reported that there was no shortage of drugs or dressings but there was a dearth of nursing apparatus. He had one medical officer but no orderlies; of the 500 wounded on board, 5 died during the voyage to Alexandria.

On the 1st May the D.A.D.M.S. tells us that the beach was a mass of men, mules, munitions and shrapnel; and the most deadly of these were the mules. Up in Shrapnel Gully, the chief highway of communication and traffic that lay between the New Zealand and the Australian positions—described in later maps as Kumur Kapu-dere—affairs were very unsatisfactory. The Turks held the heads of the gullies leading into the main dere and dominated all our movements by rifle fire and observed shrapnel bursts. With the object of improving our positions at the head of the gully, an offensive was prepared designed to deny observation to the Turks. The operation was to include a knoll—Baby 700—overlooking the left fork or "Monash's" Gully, and was to include a general advance of several hundred yards to the N.E. and E. entrusted to the New Zealand and Australian Division. One section of bearers from the advanced dressing station at Walker's Ridge was detailed to proceed to the head of Monash's Gully, and at the fork in the dere, near the base of "Pope's Hill," a dressing station was formed in touch with Captain Baigent, N.Z.M.C., R.M.O. to Otago.

The attack commenced at 8.30 on the night of the 2/3rd May. The Otago Battalion, hung up by severe machine gun fire, were unable to advance far and had heavy losses. The work of collecting the wounded was unusually difficult; it was a very dark night but no lights could be shown; it had rained, and the

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bed of the dere was in places ankle deep in mud and congested with traffic so that the carry to the beach took three hours with four men to a stretcher. Private Heaver, N.Z.M.C., was killed that night on "Deadman's Hill" between "Pope's Hill" and "Quinn's Post" in attempting to rescue a wounded Otago man. A strong local counter attack by the Turks the following morning regained all the ground they had lost, and a small party of Otagos was cut off in a recaptured trench. Owing to the large number of wounded the bearers were reinforced by one section sent up under Captain A. V. Short. The casualties in the New Zealand and Australian Division for this operation were heavy:—9 officers killed, 26 wounded, 1 missing; 161 O.R. killed, 530 wounded, total 727;—Otago's losses particularly heavy. There were many wounded for evacuation by stretcher, and much difficulty from rifle fire and shrapnel. Traffic was completely held up in the Gully by snipers for a time until the Engineers constructed protective traverses and buttresses. The N.Z.M.C. losses were: 1 killed, 2 wounded. Evacuations were completed by the 4th, when most of the bearers returned to Walker's Ridge. Captain Baigent, in a short account of this operation, states that he was unable to show any lights at his R.A.P. as it was much exposed and quite unprotected. He refers to "Murphy"* the Australian donkey man who rendered valuable assistance in getting the wounded down the dere. All his wounded were evacuated by the afternoon of the 4th. He says: "the work of the N.Z.M.C. bearers and the water duty men was splendid—they were all badly in need of a rest."

By an order published this day the name "ANZAC" was made official: the beach where the main body had landed was given this name, and later it was applied to the whole position occupied by the Australians and New Zealanders.

OPERATIONS AT HELLES, MAY 8TH, 9TH, 10TH.

On the night of 5th May the three New Zealand bearer subdivisions embarked from a small pier erected close to the Australian C.C.S. and marked at night by a red light. They were to accompany the New Zealand Brigade to Helles for the attack on the 10th. The party boarded the T.B.D. *Bulldog* at 1.30 a.m. It was a cold and windy night, but the crew took as many of the bearers as they could accommodate below and regaled them with hot cocoa. The officers slept in the ward room, the naval officers making them right welcome. The parties landed at "V" beach and

* Pte. Simpson, A.M.C., a bearer of one of the Australian Field Ambulances, according to Lt.-Col. Beeston. See his booklet, "Five Months at Anzac."

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had orders to follow the brigade into rest area about two miles distant along the main road to Krithia. A cobbled road, much wheeled traffic, many canvas camps on either side—all very different to Anzac! The bearers rested in an olive grove near a dry water course, and on the 7th moved off across country behind their brigade. During this movement, Lt.-Col. Peerless, V.D., R.M.O. to the Canterbury Regiment was wounded. He was replaced temporarily by Capt. Mitchell, N.Z.M.C., from the bearer sub-divisions. That night they bivouacked at "X" beach and on the 8th an advanced dressing station was formed near "Pink Farm," a house situated on the left of a road leading north from "W" beach, about 3000 yards from the landing place.

After an intense bombardment the New Zealand Brigade advanced in successive waves at 10.30 a.m. on the 8th. They were temporarily checked after reaching 250 yards from their jumping off position, but ultimately made about 400 yards of ground at heavy cost, and dug in where they lay, 300 yards south of Krithia, in fields thickly sown with poppies and ox-eye daisies. The ground gained was held and consolidated during the following days until the night of the 11th, when the old "enemy" of long past manoeuvre days in Egypt, the 42nd East Lancashire Territorial Division, relieved. The casualties were heavy: from the 6th to the 10th of May, 128 killed; 653 wounded or missing; total, 781; over 25 per cent. of the effectives.

Major Craig, R.M.O. to the Auckland Battalion was seriously wounded on the 8th, while tending wounded in the open. Capt. Baigent of Otago, and Capt. Mitchell, replacing Lt.-Col. Peerless wounded, established their combined R.A.P. in a building called "White house," a small ruin consisting of three stone walls and a mud floor, it had no roof, it was much exposed to shrapnel and rifle fire hence difficult to clear by daylight. Many wounded, about 40 in all of the 29th Division and the New Zealand Brigade, were sheltered here during the day, one of the chaplains, the Revd. Thos. F. Taylor, helping to bring them in. To the left of our line in the Sagali Dere, Capt. Home of Wellington had his R.A.P and from there the bearers had a long carry down the dere to the beach or to the dressing station at Pink farm.

On the 9th the transport of the 87th Field Ambulance was available as far as the collecting post; walking wounded could reach the beach either by the track or down the Sagli Dere on the left; but many stretcher cases had to be carried direct to the beach by hand, and by this means during the night of 8/9th close on 200 cases had been evacuated on both routes. On the 9th the Otago

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Battalion which had been in reserve was ordered up to connect Wellington's right with Canterbury's left. Capt. Baigent went forward in this movement, reaching a small ruined hut without a roof and on high ground very much exposed about 50 yards behind our front line. It was impossible to evacuate wounded by daylight from this R.A.P., but all were carried away during the night that followed. All through the anxious day in this exposed hut, the Rev. John A. Luxford, a South African veteran, chaplain to the Otagos, was conspicuous in his attentions to the wounded. By midday on the 11th all R.A.P.'s were cleared and the bearer subdivisions marched back to their camping ground, returning to Anzac on the 20th.

During the absence of the brigade many striking events had been recorded in Anzac. The New Zealand Mounted Brigade, 1500 strong, had landed, and with them the bearers of the New Zealand Mounted Field Ambulance. There had been much trench fighting at Quinn's Post at the head of the dere. Major-General Bridges, commanding the 1st Australian Division, had died as the result of a wound of the femoral artery dealt him by a sniper in Shrapnel Gully.

On the 18th of May there was heavy shelling by 8 and 11 inch guns from the direction of the Dardanelles. Part of the works at Quinn's Post were blown in. Information was obtained that there was much movement of Turkish guns and troops in the direction of Anzac. The enemy was reinforced and a determined counter attack by the Turks culminated on the 19th with a general assault on all sectors. The newly arrived 2nd Turkish Division was engaged: their losses must have amounted to 9000 killed and wounded as all attacks were beaten off with heavy slaughter; our artillery and machine guns, wonderfully handled, ploughed bloody furrows in the Turkish massed infantry. The losses of the New Zealand and Australian Division were not heavy; 65 killed, and 237 wounded during the two days, 18th and 19th. The total loss for our division from the 25th of April—the landing—up to the 20th May, the Turkish counter-attack, was 659 killed, 2212 wounded, 594 missing, in all 3465. These losses had been in part made up by the reinforcements and 2000 mounted riflemen.

The dead lay in festering heaps in front of our trenches, and on the 20th, two Turkish medical officers with Red Crescent flags approached Pope's Hill. Two Australian medical officers went out to meet them. The Turks desired an armistice to bury their dead and collect their wounded. The armistice granted on the 24th had good sanitary reasons to justify it, the dead lying in front of our

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parapets became a nauseating source of discomfort to the defenders and afforded a breeding place for an intolerable plague of blow-flies. Several N.Z.M.C. officers went out with the burial parties. Some of our missing were found to be dead and were buried where they lay. A few Turkish wounded who had been lying out in the open for over three days were brought in by us and in several instances their wounds were badly fly-blown, an R.M.O. in his diary says, "crawling with maggots." This condition was not frequently seen, but it is sufficiently known in the East as external myiasis. The *Sarcophagides,* the "carcass" flies, have a black and white chequered abdomen, they extrude living larvae which are armed with powerful claws capable of tearing and consuming all animal tissue, including soft bone. They burrow deeply and attain full growth in a few days, when they abandon their feeding place to pupate in the ground. Such infection of a wound can only occur under rare conditions. It is stated that over 3000 Turks were buried on armistice day. Capt. Home, N.Z.M.C. had some conversation with a Turkish officer who informed him that the 400 Australian and New Zealand prisoners in Constantinople were safe and well-treated.

During the month of May the extent of the Anzac position had been somewhat enlarged by the establishment of outposts on our left flank. No. 1 outpost was on a detached hill on the left bank of the Sazli Beit Dere, some 500 yards from the extremity of Walker's Ridge; No. 2 outpost and No. 3 outpost were on small under features close to the beach some 1000 yards further on to the north, No. 3 outpost the furthest out on the left bank of the Chailak Dere, No. 2 on the right bank of the Sazli Beit Dere. The water courses or "dere" which were dry at this season of the year, both took their origin on the heights of Sari Bair. A long communicating trench, the "Big Sap," connecting these posts with dead ground at the foot of Walker's Ridge, had been dug and continued round the cape at Ari Burnu so as to give protection against the constant rifle fire directed against this point. The full extent of beach covered by the New Zealand and Australian Division along this line of communication was about 3000 yards, from Shrapnel Gully to No. 3 outpost.

The New Zealand main dressing station on Anzac Beach, now well established at its old site—fairly well dug in and sandbagged, an operating tent pitched—was receiving many wounded and sick: during the first fortnight of its work, 637 wounded and 177 sick had passed through. There were two advanced dressing stations, one of these was in Shrapnel Gully at the foot of Pope's Hill at the site already used by the bearer sub-

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divisions during the Otago operations early in May. This station had sandbagged walls and, at first, a canvas roof, one bell tent pitched hard by, and a few small dug outs excavated by the personnel. Evacuations from this A.D.S. had to be carried out at night owing to aimed rifle fire from the Turkish trenches 400 yards away at the head of the gully. The other advanced dressing station was at the foot of Walker's Ridge in the site originally chosen by Major O'Neil. A safe passage for the bearers had now been provided by the "Big Sap" from both the outposts where R.M.O.'s were on duty.

In the later half of May and early June, the sickness rate of the division was noticeably increasing. Cases of gastro-enteritis had been common for some time, by the middle of June, in spite of heavy fighting and an increasing severity of shelling on the beach, the sick evacuated were in the proportion of three to two of the wounded; and by the end of June, sickness was assuming alarming proportions, equivalent to 35 per 1000 per week. Owing to incessant shelling of the beach, substantial sandbagged walls and head cover had to be made to protect the main dressing station, and a shelter for wounded accommodating 60 stretchers. By breaking up the shattered boats of the first landing parties, sufficient timber was obtained to form a roof on which 9 inches of earth was heaped. At first, no operations, except those required for the arrest of haemorrhage, were performed at the main dressing station, as expeditious evacuation to hospital ships was possible; but on occasions when the sea was rough, it was necessary to detain the wounded for some time, so that abdominal wounds were subjected to immediate operation, the cases being detained ashore for three to four days after operation. About 25 per cent. of such cases were ultimately evacuated in good condition, the remainder dying after operation. A considerable number of head injuries involving a depressed fracture were also treated by operation at the M.D.S., the immediate results in these cases appeared to be good. Early operation in both conditions, with retention of the patients, was the rule for a time at least, but the increasing accuracy and effectiveness of the enemy shelling, now from two points of the compass, ultimately wrecked even the sandbagged shelters and compelled removal to safer quarters at the foot of Walker's Ridge; but here, operations were quite out of the question owing to dust and flies. The shelling of the dressing station by the Turks was unavoidable owing to the crowded condition of the beach. No red cross flag was flown most of the time.

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In the old main dressing station the wounded frequently arrived on donkey back and were able to ride right up to the dressing table on to which they could be assisted. The famous donkey man "Simpson," possibly apochryphal, who with his little Egyptian donkeys assisted so many wounded down the Shrapnel Gully—"the valley of death" as some diaries name it—was reputed to have been killed in May. Many of the Australian field ambulance bearers and our own made use of these handy little animals for those who were lightly wounded—a novel method of ambulance transport attracting much attention, and a peg for many a pious tale. The donkeys of the New Zealand field ambulances were used also for water transport from the beach to the advanced dressing stations—most units had purchased a few donkeys either in Egypt or at Lemnos—they would have proved more useful if they had been shrapnel proof, or had been blessed with hides as tough as the shagreen skin of the wild ass the "Peau de Chagrin" of Balzac. As water carriers they were, while they lived, invaluable.

No water carts had so far been landed, and no wells of any importance located. In some the water was brackish, others early polluted during the heavy fighting. The main source of supply was from barges arriving daily at the beach, from which the water was pumped into troughs, and later tanks. The water duty men of battalions were mainly used as medical orderlies to the R.M.O., as they had no water-purification duties to perform; some of them were employed as supervisors of sanitary work—in either capacity the N.Z.M.C. details attached to battalions were most useful to the R.M.O.'s One of these, L/Cpl. Singleton, D.C.M., already referred to as doing good work on Walker's Ridge in April, while standing just outside the main dressing station on June 24th sustained a wound in the back, penetrating the abdomen, from which he died on the 25th. Other casualties in the N.Z.M.C. were three killed, and three or four wounded. One of the water duty men met with a strange death—bayonetted by our sentries who mistook him for a Turk as he was returning to our lines from a burial party at night.

This concludes what may be described as the first phase of the Anzac Campaign. The landing; the consolidation of the position; the repulse of the counter attack. The military situation was now one of stalemate, stationary warfare, and the minor enterprises of trench fighting.

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CHAPTER IV.

The Summer Months at Anzac. New Zealand Bases in 1915.

With the coming of summer and the degeneration of the military operations into a condition of stagnation—a veritable siege of the Anzac garrison—sickness, the enemy of all beleaguered garrisons, joined forces with the Turk and took daily an ever increasing toll of victims. In the first week of June, the evacuations by sickness from the Anzac corps amounted to 456; but during the last week of the month, 818 sick were evacuated from the beach—a sickness wastage equivalent to 35 per 1000 per week, or one brigade a month.

Gastro-intestinal disorders had become almost universal by the end of June, severe diarrhoea with bloody and mucoid stools were the common symptoms. The rations were at first blamed: it was suggested that the excessive consumption of "bully beef" and fresh meat with a lack of fresh vegetables was the cause; others considered that the frying of the meat in the mess tins—every man cooked for himself in those days—and the consumption of army biscuits were the aggravating causes. What is one man's meat may be another's poison, wherefore, during the Armistice, our men swapped army biscuits for rye bread with the Turks.

By the middle of the month the first cases of "Enteric" or "Typhoid" were notified to A.D.'sM.S by the base and stationary hospitals at Mudros. There was an immediate search for carriers, those known to have had typhoid were evacuated and a request was made for a resident pathologist. The prevailing diarrhoea was now found at the bases to be baccillary or amoebic dysentery.

Flies, first noticed about May 15th, had become a pestilent horror towards the end of June. The D.M.S., Surgeon General Birrell, was consulted. His memorandum, although subjected to much humorous criticism, was on the whole quite sound in view of existing sanitary knowledge in the M.E.F. He pointed out that the breeding places should be located and that all refuse should be dealt with promptly by incineration or otherwise; the use of fly-papers was recommended. A very senior officer, a brigade commander, promptly indented for 4000 fly-papers and miles of string so as to festoon the dere—a *reductio ad absurdum*, which damned the memorandum. Crude petroleum was indented for, but

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little could be obtained, for the reason that the Black Sea was closed and the Persian oil field inactive.

Sanitary methods were rigorously enforced. A sanitary officer was appointed to each sector of defence. Major Sinclair, N.Z.M.C., D.P.H., since dead, was then divisional sanitary officer; we have seen that he landed with the advanced guard, armed with a testing case and charged with an impossible duty, to advise on the purity of the water consumed by the half-maddened fighters struggling about the muddy water holes of Shrapnel Gully during the first days of the landing. Other medical officers and one dental officer, Captain McKenzie, N.Z.M.C.—who shortly after landing established a dental chair somewhere in the trenches near Russell's Top—were allotted to sectors of the defensive position and assumed sanitary control over the beach and other unallocated areas. In the trenches scrupulous cleanliness was aimed at: refuse which had previously been thrown out at the back of the parados, or promiscuously, was buried or incinerated. Wells were controlled; some water holes were condemned and put out of bounds; the issue of fresh meat was cut down for trench troops and alternative issues of potatoes and oatmeal were made. Lime juice was issued twice a week. R.M.O.'s were allowed to draw condensed milk, arrowroot, and bovril in small quantities for issue to walking sick; the regimental sick kitchen for light diets became a feature of the R.A.P. at a later date.

Towards the end of the month Colonel Manders complimented the medical officers on an improvement in sanitary conditions; but it was now evident that there was a serious incidence of "enterica" amongst the New Zealand troops; and that amoebic and bacillary dysentery were epidemic. It was suggested that the amoebic dysentery was imported by carriers from Egypt, but it was known to be endemic on the Gallipoli Peninsula in pre-war days, and it is now known, although at that time not proven that this disease may be fly-borne to the same extent as is bacillary dysentery. The "enterica" cases were, in part, due to infection by carriers, ambulatory and undetected cases, or ordinary carriers from Egypt, but most frequently by carriers amongst the Indian troops, aided by fly infestation, and open latrines. The first latrines had been dug on the beach at low water during the days of the landing: later, small trench latrines were established, but were not much used when the shelling of the beach areas became intolerable. Deep and shallow trench latrines had their adherents. The steep ground at Quinn's Post offered little space for shallow trenching, so that deep trenches

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were used there until all available space was exhausted, when galvanised iron buckets or other substitutes and permanent latrines were established in or near the trenches. Infection by water was not an improbability: there was a very limited supply—about two pints per man daily—of authorised water; the wells were probably soon contaminated owing to lack of pumps and the surface pollution which was inevitable in the earlier periods of the fighting. The distance from the bases and the lack of pathologists and prompt notification of infectious diseases, bacteriologically diagnosed, prevented earlier segregation of the dangerous ambulant cases of typhoid, paratyphoid and dysentery, which were treated at the R.A.P.'s and permitted to remain as a source of further infection.

The sanitary diaries of N.Z.M.C. R.M.O.'s and district sanitary officers, still extant, serve to show that the medical staff were triers and were acting up to existing lights. The following extracts from a sanitary diary are typical:—

"REFUSE. Between the top support trenches and the fire trenches, refuse has been thrown over the parapet. All through the sector refuse is lying about; at X Sap I have noticed a foul refuse heap which has been there for several days, it is now swarming with flies. It should be covered in immediately." We knew later that covering in was of no avail, the flies had already laid their eggs, the larvae would emerge through an incredible depth of light soil. Incineration was the only remedy.

"URINALS AND LATRINES. Notices should be put in the trenches directing troops to these places."

The writer goes on to condemn the shallow trench latrines which had been abandoned at the beginning of the year in France—at least in the trenches—and advises deep trench latrines 6 feet deep, 2 feet broad, 10 feet long, with a rail supported on two biscuit tins filled with sand, with the usual "antisplash" apron of biscuit tin to prevent soiling of the ground by urine and the undercutting of the trench walls to prevent fouling. Such a latrine would suffice, he says, for 500 men. Disinfection with lime was recommended. The extract continues:—"The A.D.M.S. recommends Indian pattern urinals: holes to be dug 2 feet in diameter and 3 feet deep with graded stones from the size of a cricket ball below to that of a walnut above." The diarist next dilates upon the duties of the regimental sanitary detachment. "The regimental sanitary squad [sic] are not scavengers and should not be employed in the collection of refuse. I would make them responsible for the following duties: (1) Refuse pits to be

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kept in sanitary condition and sprinkled with lime; (2) Night urinals [biscuit tins adapted] to be emptied in the morning, sprinkled with antiseptic and replaced in the trenches at sunset; (3) Supervision of latrines and urinals [Indian pattern] which should be periodically treated with lime or antiseptic; (4) Report all uncleanly areas in the trenches or bivouac to the R.M.O.; (5) Where pits are dug the sanitary men should have fatigues to assist them." All of which was in accord with current teaching as in F.S.R., Part II., Chapter X. On the dietary of the troops the sanitary diarists had something to say also:—

"MEAT ISSUE. One half of the present bully beef would be ample, much of it is thrown away. The fresh meat issue is too large; with the cooking utensils [the mess tins only] available, the meat cannot be used before putrefaction sets in." [The meat became fly-blown by viviparous "green bottle" flies.] "Some men are suffering from boils and an intractable superficial inflammation of the skin [desert sores?]. I have asked for an extra ration of lime juice for these men for medicinal purposes. Bacon, cheese and jam are plentiful, and much appreciated, but the bacon is too salt and there is no water available for soaking. I would strongly recommend an increase in the water ration, the quantity allowed is not sufficient to keep the men healthy. I have measured carefully the milk cans for the supply of water and find that they hold 2¼ gallons when filled to the top. The water has been issued in these cans on the assumption that they contain 2½ gallons. Allowance should be made for this shortage." The water supply was jealously guarded; this haggling about two pints amongst nine men is very pathetic.

A note from Captain Baigent's diary:—"In May the New Zealand Brigade relieved the 4th Australian Brigade in Quinn's and Courtney's Posts. Sanitation was a very difficult problem in these days owing to the great heat, the prevalence of flies and lack of space. Courtney's Post would not accommodate the whole battalion, and the men not actually in the trenches were bivouacked on terraces. The only space available for latrines was on the slope exposed to snipers, thus necessitating the construction of sand bagged protection. Later on we were forced to tunnel through a knoll about 30ft. in order to use a small protected hollow on the other side for latrines. Flies were our main worry. The men had the greatest difficulty in swallowing their food before the flies attacked it. Owing to the heat and the swarms of flies, fresh meat had to be cut up immediately it was received and put into dixies and stewed. My R.A.P. at Courtney's

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was situated 30 yards below the crest of the hills, and the rear line of trenches. Wounded and sick were evacuated to the field ambulance dressing station further up Monash's Gully in charge of Major Murray. Drugs were drawn [direct] from the advanced supply depot of medical stores on Anzac Beach." On the question of the supply of drugs to the New Zealand and Australian Division there is more to be said later.

The Posts at Quinn's and Courtney's were both of great military importance, and of course hotly disputed, Quinn's especially, guarding the head of the right fork of Monash's Gully was a most dangerous death trap place where the Turkish works and ours almost adjoined. Affairs of mine and counter-mine, fierce bombing raids, even hand to hand encounters were not uncommon. The 16th Battalion of the 4th Australian Brigade had deplorably heavy losses early in May, but at the time described by our diarist the line had been more or less consolidated.

Captain Home, N.Z.M.C. of the Wellington Battalion writes of these posts and their difficulties. "Tuesday, June 1st. Moved this morning from Reserve Gully to Courtney's Post on the south side of our general position. Courtney's Post hangs by its eyebrows on the edge of a steep gully, and we are camped in bivouacs dug out on the declivity. Here it is a war of trenches and explosives, of bombs, grenades, mines and counter mines and other infernal machinery. We have dynamiting parties out every night and mines burrowing towards the Turk trenches—as they are also mining towards us it is a matter of acute interest which side gets the blow up first. So far the honours are about easy, but the Turks have more than once rushed the crater, but none of them got back again, so that if they had the honours that time we took the tricks. My chief worry is the impossibility of proper sanitation on the crowded hillside, and flies are becoming very thick. When we first took over it was a sort of rabble (sic) ground, scrambling, unformed, loose tracks, and bivouacs scraped out here, there, and everywhere on the hillside, so that Colonel Malone said that getting the men out was like digging periwinkles out of their shells. They looked just like a lot of magnified rabbits, both in their earth works and their sanitary arrangements. Colonel Malone had the steep hillside terraced so that the men of a platoon could settle down side by side. Proper steps were made so that men could get a decent hold coming up and going down."

The Wellington Battalion was very highly disciplined and well organised by the genius of Lt.-Col. Malone. His domestic arrange-

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ments were well cared for by his R.M.O. and his Quartermaster, Captain Dallinger, N.Z.S.C., since dead. In this battalion which did so much to organise and domesticate Quinn's and Courtney's the interior economy was always at a high level. Some form of company kitchen had been established, even at Quinn's, under the direction of Captain Dallinger, who had at one time been through the school of army cooking at Aldershot. There were trench fires and Flander's kettles, and no doubt there was expert refuse disposal. The water duty men were employed as medical orderlies at the R.A.P., one of them as sanitary corporal. This appropriation of water duty men was, at Anzac, for a time justified as there were no water carts in use. The bulk of the water arrived in barges and was stated to be already chlorinated.

In July was reached the height of the summer heat: night temperatures in spite of the sea breeze were higher than the day temperatures which ranged from 83° to 85°F in the shade at midday. Sickness had reached dangerous proportions: the weekly evacuations from the corps by sickness alone exceeded 400. A return received by the A.D.M.S. from Mudros showed that 61 cases of enteric had been diagnosed at the bases, in all 142 cases from the corps. Early in the month there was a cholera scare, one or two cases had been diagnosed tentatively—they proved later to be severe baccillary dysentery. Orders came from the D.M.S. to initiate anti-cholera inoculations. On the 7th July the A.D.M.S. distributed vaccine, prepared at St. Mary's, London, and by the 16th, 4000 men had been immunised; the reactions were mild. Two "cholera hospitals" were projected, one for each division. All water was to be chlorinated, but for various reasons this could not be done: of the canvas troughs issued to units for the purpose very few remained intact.

About this time the unusual consumption of drugs and medical comforts by the New Zealand medical officers was commented on. There was a shortage of castor oil, a drug much in favour at the time. There was sharp division of opinion amongst medical officers as to the merits of holding up sick at battalion headquarters, feeding them on medical comforts, drugging and treating them on the off-chance of keeping up effective strength. Some R.M.O.'s did not believe in the R.A.P. "soup kitchen," but thought it best to evacuate to the field ambulance who were holding all the sick that they could accommodate. The R.M.O.'s were trying to hold men in the ranks. Anzac was now one big hospital. Towards the end of the month of July, one of the brigadiers held a conference of his R.M.O.'s to discuss the

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steadily increasing sick rate of his brigade; the concensus of medical opinion expressed was as follows:—"(1) The general health of the troops and their physical condition is below normal and is getting progressively worse; (2) No further steps can be suggested to improve hygienic and sanitary conditions other than change of bivouacs to a fresh, unused site; (3) The principal symptoms of the sickness are:—gastric derangement, bronchial affections, loss of weight, rapid pulse, dilation of the heart; (4) Predisposing causes: irregularity of rest and meal hours: restricted dietary as regards variety; heat, dust, and flies."

It was freely granted that the very arduous work called for was necessary and unavoidable. There was feverish preparation forward for the August offensive. Battalions were depleted, the average strength 25 per cent. below normal. The bacteriologist at Mudros reported the causes of the sickness to be:—dysentery of shiga type, amoebic dysentery and undifferentiated "enterica." The A.D.M.S. advised the D.M.S. that the health of the division was bad and likely to become worse and authorised a rum issue three times a week to act as an appetiser, a cocktail to coax the men to eat their rations—a very popular A.D.M.S. for the nonce.

One of the most dreadful of the sanitary problems was the disposal of decomposing bodies lying in the vicinity of the trenches, sorry memorials of repeated attacks by the Turks under Enver Pascha, who came at the end of June to drive the Anzacs into the sea, but left some 300 dead in front of our trenches; another holocaust, but, unfortunately, not a whole burnt offering to the gods of Anzac. From the decomposing bodies there came an unbearable stench in the trenches; an extract from the diary of a sanitary officer gives luminous if repulsive details:—"July 5th, DECOMPOSING BODIES. Lime is urgently required to deal with this trouble. Enemy dead are lying within a few yards of No. X Sap. The stench is abominable and the trenches are crawling with maggots. Troops have to remain in the trench constantly, the smell causes them to vomit. It is impossible to remove or bury the bodies as a machine gun is trained on the spot." [Enemy trenches not many yards away.] "Lime would greatly improve matters as I have already found out."

Of these noisome dead, over 200 were buried on the night of 2/3rd July by the New Zealand Mounted Brigade. In other instances the bodies were sprinkled with kerosene and burnt; where the enemy trenches were very close to ours, it was necessary to use grappling irons and drag for them; the decomposing body

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was hauled into our trenches, dragged on an oil sheet through the communications and buried in dead ground. There are strange stories of the bodies burning as was thought, from spontaneous combustion, and it has been surmised that the inflammable gases generated by decomposition within the abdomen were set alight by bombs or rifle bullets exploding cartridges in the dead man's belt.

To these major horrors were added the "minor horrors of war." Lice infestation, first noted at the Suez Canal in February, had now become a universal torment because of propinquity, inadequate means of disinfestation, and partly through ignorance of the life habits of the parasites.

Meanwhile military matters of great moment were in prospect as the following extract from the diary of Captain Guthrie, N.Z.M.C, R.M.O., of the Canterbury Mounted Rifle Regiment, shows:—"July 19th, 1915. One notices a general preparation on all sides, the supply depot below us is increasing steadily in size. Large boiler-like tanks are being put in place with pipes laid on; an engined pump is installed at Anzac. All communication trenches are being widened; a road along the shore to No. 2 outpost is being made. Last night a complete howitzer brigade came ashore, 18 guns. Men are practising hill climbing, Anzac beach and foreshore are piled up house high with all sorts of stores and ammunition. All this work is done at night time. Every precaution is being taken against gas. We all have masks; Vermorel sprayers are in the trenches. Some day, not very far away, more troops will land and an advance on a big scale will be made." With Anzac thus busily engaged and no fighting in prospect until August 7th, we can afford a moment to look back at New Zealand and its doings since the main body left, and what had happened at overseas and the home bases during the first year of the war.

In New Zealand, shortly after the departure of the main body, reinforcements on the highest scale had to be despatched at regular intervals, and in order to concentrate, train, and equip these reinforcements, a large tented camp was opened at Trentham on the site of the Dominion Rifle Association's Ranges, situated in the Hutt Valley, some 20 miles N.E. of Wellington on the Wairarapa line of railway and adjacent to the large station used for the service of the Trentham Race Course. Concurrently with the mobilisation of volunteers from the existing territorial force and the civilian population, the training of the territorials and cadets was successfully carried out during the year 1914-1915,

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Colonel J. R. Purdy, C.B.E., T.D., D.M.S. in New Zealand.
(Died 1924).

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the number so trained exceeding the numbers trained in previous years, and the spirit of enthusiasm animating the trainees was of hopeful augury. The work done by medical officers of the territorial force, somewhat depleted in numbers by the demands of the expeditionary force, had been very satisfactory, and the training of the territorial ambulances had gone on uninterruptedly. The D.M.S., Colonel Will, V.D., as we have seen, embarked with the main body as A.D.M.S.; he was replaced by the late Colonel Jas. R. Purdy, T.D., N.Z.M.C., who had previously held the appointment and was now on the reserve. All the expert work in connection with the mobilisation of medical troops and formations, the recruiting of medical officers, the medical and sanitary supervision of the large concentration camp, and provision for sick from this and other N.Z.E.F. camps, besides the routine work of supervising the medical arrangements of the home territorial force, N.Z.M.C., had to be shouldered by the D.M.S., a general practitioner, a part time officer whose annual honorarium as D.M.S. amounted to no more than £150. This arrangement was felt to be anomalous by the general staff and, in his annual report in June, 1915, the general officer commanding the forces, Brigadier General A. W. Robin, recommended the appointment of a whole-time D.M.S. General Robin says:—"Under the present conditions of a small annual remuneration, the director of medical services can hardly be expected to sacrifice his private practice, which represents the major portion of his income, nor is the department in a position to demand more than an equivalent of his services."

The first duty of the D.M.S. was to recruit medical officers for the N.Z.E.F. This he did by enlisting the assistance of the British Medical Association (New Zealand branch), who published an appeal for volunteers in their journal. A second appeal was never made: volunteers were immediately available and continued to come in freely all through 1915 to furnish reinforcements, to man the new medical units formed, and to staff the training and concentration camps, the most important of which was Trentham, the final jumping off place for reinforcements.

Trentham Camp was situated, as we have seen, in the Upper Hutt Valley, a healthy country district, very thinly populated. Surrounded by steep hills, there was an area of flat country in the valley, the soil being a stony or gravelly loam, fairly permeable, the sub-soil, river gravel of high permeability; very dry in summer time but inclined to be damp and retentive of moisture during the winter months. The rainfall was somewhere about 60

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inches per annum, being 20 per cent. to 25 per cent. greater than at sea level in Wellington. The flat land was in reality the old bed of the Hutt river now confined to a narrow swift stream at no great distance from the camp and affording pleasant bathing places for troops during the summer. There was somewhere about 400 acres of good flat land near the rifle ranges available for tents, giving ample accommodation to about 4500 men for tentage and training grounds, besides some 860 acres of broken, hilly land, part of it suitable for manoeuvres of the Anzac type. Pleasant enough during the summer months but when the winter of 1915 came,—May to July in New Zealand—the low permeability of the top soil which contained a trace of clay, the heavy traffic in the roadless camp and abundant rains, produced the inevitable sea of mud, the concomitant of many previous camps in New Zealand, notably those inspected by Sir Ian Hamilton in 1914. Lack of floor boards in the tents, lack of drying rooms and a shortage of boots for a second issue, led to much discomfort, to which many of the newly joined recruits were as yet not inured. Since November, 1914, cases of measles had been notified to be slowly increasing, and in May a dangerous overcrowding which brought the camp population up to 7000 resulted in a serious epidemic.

The measles outbreak, at first of a mild nature, gradually increased in severity until, about midwinter, it acquired an unusual virulence. Cases were described as being "malignant": a suffocative type with septic bronchitis, and a haemorrhagic type —"black measles"—were observed. It is, of course, open to argument that the last named cases were indeed examples of the cerebro-spinal meningitis which broke out later. There was no military hospital then, in New Zealand, with the exception of a small camp hospital in marquees. The Wellington Public Hospital acting as a base hospital soon became overcrowded, so that a temporary hospital had to be improvised. The old plague hospital at Berhampore in Wellington, built by the City Council in 1900, during the plague scare, was taken over and enlarged by the use of marquees. This hospital in turn became seriously overcrowded and early in June had 87 patients with a staff of 3 nurses, 1 sergeant N.Z.M.C. and 4 O.R. A part time medical officer was visiting three times a week.

The rapid onset of dangerous symptoms and the early unexpected termination of many cases of pneumonia and the alarming death rate were freely discussed in the press of the Dominion at the time, so that public attention was focussed

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betimes upon the epidemic, to the prejudice of the medical service. The Minister of Defence now realised the impossibility of carrying on his medical arrangements by means of a loosely organised part time territorial medical service, which, because of economy in the years during which the territorial force was coming into being, had not been provided with a permanent staff nor organised, as it should have been organised, for war. When the territorial scheme was first initiated in New Zealand, an agreement was come to between the Inspector General of Hospitals and the D.M.S. whereby all sick of the territorial force were to be admitted to the public hospitals under the control of the health department* Under this agreement the chief health officer had already made provision for sick and wounded of the expeditionary force prior to this date. In this extremity of medical disorganisation the Minister of Defence appealed for assistance to the Minister of Health. The Minister, then the Hon. Col. Heaton Rhodes, offered the services of his department freely, and as the result of conference it was decided that Dr. Thos. Valentine, D.P.H., Chief Health Officer of the Dominion, and Inspector General of Hospitals, should be appointed Director of Military Hospitals (D.M.H.), with the rank of Hon. Col. in the N.Z.M.C. His responsibilities were defined as being:—

(1) Provision for treatment in hospitals and convalescent homes of all sick and wounded of the N.Z.E.F.; (2) Sanitation of camps; (3) Control of N.Z.A.N.S. until posted to the N.Z.E.F.

The D.M.S. was made responsible for:—(1) Military organisation of the N.Z.M.C., training, appointments, transfers of personnel; (2) All medical arrangements (except sanitation) in camps and camp hospitals; (3) Medical embarkation and disembarkation duties; (4) Examination of recruits and, in part, invaliding boards. The new arrangement came into force in June.

Colonel Valentine acted with vigour as soon as appointed, and in as much as he already controlled the necessary hospital accommodation and was a government servant of long standing and had a staff of trained medical officers, he was in a much stronger position to act than a part time territorial officer. The "Victoria" ward at Wellington Hospital was opened as a military ward of 60 beds; large wool stores at Kaiwarra, providing accommodation for 150 beds, were placed at his disposal by patriotic merchants; the race course buildings at Trentham were appropriated, a large tea kiosk giving room for 100 beds, the

* Under the Hospitals and Charitable Aid Act of 1908, all public hospitals in New Zealand are in part maintained by rates, in part by Government subsidy and are under the part control of the Inspector General of Hospitals, who is also chief health officer.

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grand stand, the trainers' quarters, even the loose boxes came into use to accommodate the 603 cases hospitalised.

As regards the cerebro-spinal meningitis there had been much doubt as to the diagnosis in the earlier cases. At least three deaths from meningitis were reported in June, but were ascribed to influenzal measles or tubercular infection. One death at sea in the 5th reinforcements who sailed in June was diagnosed cerebro-spinal meningitis, but it was not until July that the diagnosis was clearly established at Trentham by the late Prof. Champtaloup, Bacteriologist to the Dunedin Medical School and the Government Bacteriologist, Mr. T. Hurley, who had been called upon to investigate the conditions. The diagnosis was confirmed by demonstrating the presence of the *Diplococcus Meningitidis* in the cerebro-spinal fluid of a fatal case, and by culture of the organisms. There were six deaths from C.S.M. in July, others, less numerous in August and succeeding months, but the epidemic never reached the severity of that at Codford in 1914 amongst Canadians and other troops, or the epidemic of 1915 in Australian Camps.*

In July the maximum number of sick in hospital from all causes rose to 872: the Trentham camp strength was at this time 7498; there was serious overcrowding; on the 9th the D.M.H. advised breaking camp. This advice met with much opposition but in the end was acted upon, and on the 10th there was a general exodus, the troops being billeted or distributed in smaller camps in the district; only 2000 remaining at Trentham. This heroic effort broke the epidemic, it flatly subsided, nor is there much evidence to show that the scattering of the troops caused any dissemination of C.S.M. in the civilian population; certainly it had a beneficial moral effect on the troops and also upon the civilians, who in some instances had accused the defence authorities of criminal neglect. Partly in consequence of this accusation a public commission, to investigate the sanitary conditions at Trentham, was summoned by His Excellency, Lord Liverpool. It consisted of His Honour Judge Hoskins of the Supreme Court, Mr. William Ferguson, a civil engineer, and Dr. A. A. Martin, who had just returned to New Zealand after a period of service with the R.A.M.C. in France. This commission was sitting at Trentham at the end of July, 1915. The findings, given later, were in agreement with the opinions generally held at that time. It was agreed that there had been insufficient isolation of measles

* During the epidemic of C.S.M. in Victoria in 1915, 644 cases were reported with 388 deaths and 60.2 per cent. mortality. The outbreak included 421 cases in the military population of the training camps.

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contacts; that the hospital arrangements in the camp were inadequate; and that the overcrowding, coupled with lack of drying arrangements and excessive dampness in the living quarters, were the predisposing causes. As regards overcrowding, it was shown that the density of population in the tented area was about 575 to the acre, with eight men to a tent, and that the floor space in the huts, of which there were only 15 at this time, was only 31 square feet per man. The huts were unlined and of unusual size: 70 feet by 22 feet by 9 feet 5 inches and accommodated 50 men each. An officer of the N.Z.E. who had enlisted in England in the New Zealand Contingent assembled at Sling camp in 1914, and who had been wounded at Anzac and invalided to New Zealand, gave evidence showing that the conditions existing at Trentham in New Zealand were comparable to but a trifle better if anything than those prevailing in the camps at Sling, Bulford and Codford, during the winter of 1914.

The general health of the troops in Trentham cannot be said to have been good during the period under consideration. The total number of cases of illness of any description requiring hospital treatment from the opening of the camp up to July 22nd, was 2813 with 33 deaths, a mortality of 1.16 per cent. of the sick. In all some 13,607 men had passed through or had occupied the camp in the period, and taking the mean population of the camp as 4,500 men, the annual mortality of the soldier population, very crudely considered, approximated to seven per thousand. The annual death rate of the civilian population of the comparable class, males from 21 to 45, the arm-bearing population, for the previous 5 years in the Dominion averaged a little over five per thousand per annum. But considerable improvement in sanitation followed the inquiry: adequate drainage, good roading and acceleration in the building of the hutments soon improved matters. The Trentham Commission recommended that not more than 30 men be allotted to each half hut allowing 51 square feet of floor space to each man, and that the total camp population should not exceed 4000. A permanent P.M.O. was appointed to the staff of the Camp Commandant, Lieut.-Col. Moris, N.Z.M.C. took over the duties in July. Material assistance and valuable advice was given to the military authorities by a medical committee consisting of civilian doctors set up to act as an advisory board. In these deliberations, the New Zealand branch of the British Medical Association played a strong part.

Four new medical units were formed in New Zealand in the first year of the War:—"B" Section of No. 2 New Zealand

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Field Ambulance, still in training at Trentham; Numbers 1 and 2 New Zealand Stationary Hospitals; and No. 1 New Zealand Hospital Ship *Maheno*. As the result of representations made by General Godley with regard to the necessity of establishing in Egypt a New Zealand hospital manned by representative New Zealand surgeons, the Defence Minister, Colonel the Hon. J. Allen, T.D., authorised the formation of the first New Zealand Stationary Hospital, which was accepted by the Army Council in April, 1915, with instructions that it proceed to Egypt. The personnel was drawn from the N.Z.M.C. of districts. Lieut.-Col. D. McGavin, N.Z.M.C., P.M.O., of the Wellington district, was selected to command the unit; he was at that time the senior major on the New Zealand army list, had seen service in South Africa, and had at one time commanded the Wellington Bearer Company. The officers were drawn from the N.Z.M.C. exclusively, several of them had active service experience and were territorial officers of some standing and prominence. They were a strong team surgically and medically; the majors, Acland and Wylie, surgeons of distinction, the former becoming at a later period consulting surgeon to the N.Z.E.F., and the latter O.C. No. 1 N.Z.G.H. at Brockenhurst in 1916. To the unit were attached an ophthalmologist and a dental surgeon, the latter acting as quartermaster. In all, seven officers, and 86 other ranks embarked on the N.Z.H.S. *Maheno* on the 20th May from Wellington, with orders to report for duty to the Imperial military authorities in Egypt. 31 ladies of the New Zealand Army Nursing Service were also embarked for service in the Imperial hospitals.

Up to May 2nd 7,928 sick and wounded of the N.Z.E.F. who had been evacuated from the Dardanelles were, or had been, under treatment in various hospitals in Egypt, Malta, and England so that the offer of a second stationary hospital from New Zealand was gratefully welcomed by the Army Council. Hurriedly mobilised, No. 2 New Zealand Stationary Hospital sailed for Egypt on the 13th June, 1915. The unit comprising 8 officers, 87 O.R. was under the command of Lt.-Col. Parkes, N.Z.M.C., P.M.O. of the Auckland military district. Like number 1 New Zealand Stationary Hospital it was well staffed as a surgical team: the Senior Field Officer, Major Savage, N.Z.M.C., was an eminent Auckland surgeon, whose untimely death from C.S.M. shortly after landing at Alexandria robbed the unit of its most brilliant member.

The No. 1 New Zealand Hospital Ship *Maheno* was staffed by 7 officers, 61 O.R. and was commanded by Lt.-Col. the Hon. W. E. Collins, V.D., N.Z.M.C. Reserve, one time a very active and

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industrious P.M.O. of the Wellington district, to whom the corps was much beholden in 1905 and the years that followed. The *Mahono* sailed in May: we shall find her at Anzac in September.

The 5th Reinforcements, nicknamed the "Fighting Fifth" were now well on their way to Egypt—July, 1915—and went into camp near Cairo prior to re-embarking for Anzac on the eve of the August fighting. The Pont de Koubeh hospital accommodated at this time some 300 sick and wounded New Zealanders, and was under the command of Major J. Powell, R.A.M.C., with, as registrar, Major W. Byam, R.A.M.C., who was later known by his work on trench fever. Certain N.Z.M.C. officers were attached to the staff as early as April, 1915, including the late Hon. Lt.-Col. Batchelor, N.Z.M.C., who took a very active part in promoting the early formation of the New Zealand stationary hospitals, as he realised the need of New Zealand hospitals for New Zealanders.

When the Anzac force left Egypt Lt.-Col. J. R. Thomas, N.Z.M.C. commanding the New Zealand Mounted Field Ambulance was appointed by Surgeon-General Ford, A.D.M.S. to the New Zealand and Australian Training Depot at Zeitoun, then 500 strong. Under him were several N.Z.M.C. officers of the reinforcements, and a number of N.Z.M.C. dental surgeons whose services were much in demand everywhere in the M.E.F. Later, when the New Zealand Mounted Field Ambulance was engaged in ambulance transport duties, in June, Major Mathew Holmes, N.Z.M.C. was appointed A.D.M.S. of the New Zealand Base. His appointment was confirmed by General Godley with temporary rank at Lt.-Col., but Holmes relinquished his duties in July at his own request, and proceeded to Anzac. He was succeeded as A.D.M.S., Base, by Lt.-Col. P. C. Fenwick, late D.A.D.M.S. of the New Zealand and Australian Division. A.D.M.S. New Zealand Base inspected the No. 1 Stationary Hospital on July 1st. They were newly arrived at Port Said. Lt.-Col. McGavin had at his disposal one house, formerly a school, 25 square E.P. tents, and some huts for messes and recreation room, but was short of equipment: what he had brought from New Zealand had been over-carried to Bombay. By the middle of the month the accommodation of the hospital was increased from 200 to 500 beds. A batch of 157 patients was transferred from the Egyptian army hospitals: 6 nurses and 3 motor ambulances were provided.

On July 22nd No. 2 New Zealand Stationary Hospital arrived after landing Major Savage, N.Z.M.C., suspect C.S.M., at Suez. Lt.-Col. Parkes was ordered to take over the Pont de Koubeh Hospital from Major Byam, R.A.M.C., then commanding. On July 27th, Major Savage was dangerously ill. He was seen by Sir David

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Semple and Sir Victor Horseby but he died on the 28th. By his death the N.Z.E.F. lost an eminent surgeon and one whose known ability must have fitted him for a leading part in the future operations of the N.Z.M.C.

Serving the two New Zealand hospitals now established in Egypt, there was a convalescent home of 50 beds at Alexandria in the Mustapha district, controlled by Lady Godley. The staff consisted of a nursing sister and a few orderlies—"B" class men from the base depot at Alexandria. It was visited daily by a R.A.M.C. officer. The house was a fine one in a big garden and very comfortably furnished; discipline was strict; the feeding arrangements excellent; it was a well run establishment doing valuable work.

We have seen that many New Zealand sick and wounded had been transported in hospital ships as far as England. Some sort of a base for Anzac troops existed at Weymouth early in 1915, but as yet no New Zealand base. In order to provide for the New Zealand casualties reaching England at this time, the New Zealand War Hospital was opened at Mount Felix, Walton-on-Thames, on July 31st, 1915. The funds necessary for its initiation had been raised in England by New Zealanders with some help from the Dominion, but without any appeal made to the British public. Dr. Bernard Myers, M.D., a New Zealander practising in England, was the first medical superintendent, and the chief controlling and supporting body was the New Zealand War Contingent Association, of which the chairman was Lord Plunket, ex-Governor of New Zealand: a society destined to play a very felicitous part in promoting the welfare of the sick and wounded of the N.Z.E.F. quartered in or visiting the Home Land.

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CHAPTER V.

The August Battles, 1915.

Following the initial success at the landing, the Anzac corps—numerically too weak in men or artillery to continue the advance on the main ridge dominating the Narrows—had been tied down to a passive defence. The area of territory so far gained was not sufficient in extent to afford full protection to the landing places nor the beaches further north, lightly held by our outposts. The security of the piers and store dumps was menaced daily by observed bombardments at moderate range. The troops were much weakened by disease, and the high sickness wastage rate of the Anzac corps threatened an attenuation which would soon rob it of all efficiency as a fighting force.

At Helles, the same deadlock existed. No further ground could be gained on the slopes of Achi Baba now gashed with tiers of trenches and bristling with barbed wire. The Commander-in-Chief, Sir Ian Hamilton, early in June, foresaw the deadlock and obtained reinforcements to the extent of two army corps to complete his task of assisting the Fleet to conquer the Narrows. There were various possible methods of continuing the offensive, but the plan adopted was to reinforce Anzac with sufficient troops to carry their original objectives, Koja Chemen Tepe, Sari Bair, the dominating points of the range, and the spurs leading seawards, with a simultaneous landing at Suvla Bay, so that a rapid advance on the left of the Anzacs might join hands with them for a final advance to Maidos from a good base and sure harbour at Suvla. The new forces were concentrated in various islands, Imbros, Lemnos and Mytelene; the early part of August was selected because the moon rose late, ensuring long hours of darkness. The water supply for so large a body of troops and transport animals was a special source of anxiety. It was believed that there was an ample supply in the Anafarta Valley. Anzac however, must be provided for: a reservoir was dug on the hill-side to be filled by a pump landed for the purpose. The pump, a very large and mysterious affair, lay on the beach for some time attracting the attention of the artillery observing officer at Kaba Tepe who, coming to the conclusion that it must be a monstrous

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howitzer, shelled it industriously, until it was eventually dragged into position and harnessed to its work.

As Anzac was to deliver the knock out blow, Anzac was to be reinforced by a division. Much heavy work was doing in preparation, well hidden "possies" for the new troops, new roads to be made, stores and munitions to be landed; hence the excessive and exhausting fatigues of the latter end of July, which are referred to in the sanitary diaries. At the beginning of August everything was in readiness and when the news spread from Shell Green to Wellington Terrace, the tired and sickly garrison were heartened and all aglow to undertake this new and promising adventure. General Birdwood was to have 37,000 rifles and 72 guns, the landing party at Suvla would comprise two divisions, and the old war dogs at Helles were to bark up at the Turks on Achi Baba, pinning them to their ground. Stealthily, by night, the new troops came in and were packed away in crowded Anzac, till the hive was full and the time for swarming had come.

The local tactical scheme was as follows:—A very determined sortie was to be launched from the extreme right of our line by the Ist Australian Division, destined to seize the Turkish "Lone Pine" positions, and, in order to attract the enemy reserves to that side, the Fleet were to simulate an attempted landing at Kaba Tepe; whilst on our left, strong assaulting columns breaking out beyond our outposts to the north were to climb in the night through the steep gorges that led upwards to the crest line of Sari Bair. On the morning after, two divisions from Suvla would be joining hands on our left and would assist in the final rolling up of the Turkish right flank. Such was the general idea; we must examine it somewhat more in detail, at least as far as the central attack is concerned, an attack in which the New Zealanders were to play an important part.

The New Zealand and Australian Division were to lead in the movement that was to seize the heights of Sari Bair. To this end the 13th Division under Major General F. C. Shaw, C.B., and Cox's 29th Indian Brigade of Gurkhas and Sikhs, were placed under General Godley's command with additional artillery. The battle orders issued from Anzac Cove by General Birdwood, dated 3rd August, 1915, read, in part, as follows:—

"The New Zealand and Australian Division, the 13th Division, less three battalions, less artillery, the 29th Indian Infantry Brigade, and 1 mounted artillery brigade, less 1 section, will occupy the line, Chunuk Bair—Hill 350, during the night 6/7th August; operations to commence at 9 p.m."

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The main ridge which shielded the Narrows from our observation ran inland almost due N.E. from near Kaba Tepe to Hill "Q", its highest point, some 2,500 yards inland from the mouth of the Chailak Dere at No. 3 outpost, and rose gradually from the sea on our right to 971 feet at its highest point on our extreme left. The ridge was the watershed of the Peninsula; on the western side Anzac and Suvla, on the eastern, Maidos, the Narrows and the only military road from Bulair to Maidos and Helles. The distance from Hill 971 to the nearest point of the Narrows was about 3½ miles. From the main height six spurs were projected towards us; the longest spur, a continuation of Sari Bair itself, terminated in Tasmania Post, the extreme right of the Australian Division facing Kaba Tepe. On the crest of this main spur a military track ran all the way up through Lone Pine, Johnson's Jolly, Quinn's Post, Baby 700, Battleship Ridge, Sari Bair, Hill Q, to Koja Chemen Tepe, dropping down at the northern extremity of the massif into the village of Biyuk Anafarta. The second spur ran seaward through Russell's Top, Walker's Ridge, and McLagan's Ridge to Plugge's Plateau; between the main spur and the second lay Shrapnel Valley with its offset, Monash's Gully; the third spur, terminating at No. 2 and No. 3 outposts, ran out to sea in a westerly direction, bounded by the Sazli Beit Dere to the South, and the Chailak Dere to the north. About two miles north along the beach from Anzac, the mouth of the Aghyl Dere (Farm Gully) opened out into flat land and was separated from the Kaiajik Dere, the next stream, by the spur Damakjelik Bair, the foot hills at this point trending almost due west delimiting the northern extremity of Sari Bair. The last spur was the Abd el Rhaman Bair running almost due north from 971 with the Asmak Dere, said to be a running stream on its seaward side. Like the spokes of a giant wheel these six spurs were projected seaward from 971. We were to attack the hub by advancing between and upon the spokes. Maps give only a poor impression of the extreme roughness and broken nature of the country where a difference of a few feet frequently meant untenable exposed slopes or dead ground completely protected from any kind of fire.

In considering the medical arrangements for this operation two important points emerge:—The line of evacuations of wounded must be along the rim of the wheel—across our front—and by hand carriage over at least 2½ miles, as there was no ambulance transport and no road practicable by daylight; sea transport might be possible if fresh piers could be erected, say, at the mouth of the Chailak Dere, the centre of the new attack. As there was no rapid means of crossing the spurs from dere to dere, small dressing

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stations would have to be established by the ambulances, in the gullies so as to be in touch with the troops on the crest of Sari Bair. Inter-communication between dere would be very difficult unless we held the whole ridge top, as the Turks occupying the hub had a clear view down all the gullies. Some sort of central depot, a C.C.S., would be required to hold and tend the wounded pending evacuation. Col. Manders would have at his disposal:—Two Australian Light Horse Field Ambulances—1st and 3rd; two New Zealand Ambulances—part of the N.Z.M.B.F.A., had already arrived —and one Australian, the 4th Field Ambulance. The 13th Division brought part of two field ambulances, bearer personnel only, and Cox's brigade was attended by an Indian Field Ambulance. The corps medical arrangements provided for two C.C.S.'s: the 13th, and the 16th to be established, one at Mule Gully—near Lt.-Col. Begg's M.D.S.—the other at No. 2 outpost. In the divisional orders it was provided that stretcher parties were to follow all columns and attend to the wounded. Bearers were not to block or interfere with the movement of troops; they were not to make use of any communication trench or sap until all movements of fighting troops through the communications had ceased. The bearer subdivisions of the Indian Field Ambulance were to be at the disposal of the officer commanding the Indian brigade.

On August 3rd, the New Zealand Brigade concentrated in Happy Valley just north of Mule Gully where the New Zealand Field Ambulance had its main dressing station. The strength of the New Zealand Field Ambulance was at this time 11 officers and 146 O.R. The A.D.S. was still up in Monash's Gully at the foot of Pope's Hill under command of Major Murray. At Mule Gully Lt.-Col. Begg had, besides his main dressing station, an "Enteritis Hospital" in charge of Major Hand Newton, who commanded the New Zealand Mounted Field Ambulance bearer parties which arrived at Anzac on July 24th, and a dental section under Capt. Don, N.Z.M.C., now fitted with appliances for the repair and making of artificial dentures and doing a great deal of work. The mouth of the big sap leading out to the outposts was not very many yards away, and some tanks for local supply of water had been recently installed. The position was not under observation and was well protected down as far as the beach by the high cliffs of Walker's Ridge. The 4th and 5th were quiet days except for heavy shelling of Anzac Beach. 1000 New Zealand reinforcements—"the Fighting Fifth"—arrived with part of the 13th Division, Cox's Gurkha Brigade, and three British field ambulances, the 39th, 40th and 41st, less their tent subdivisions.

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By August 6th the final preparations for the advance that night were complete. At 2 p.m. Col. Manders held a conference of field ambulance commanders at the New Zealand M.D.S. at Walker's Ridge for the purpose of distributing the new 1/20,000 maps and explaining more fully his orders, of which the following is an exact copy:—

[Secret.

MEDICAL CORPS ORDERS

BY

Colonel N. Manders, A.M.S., Commanding Medical Corps, New Zealand and Australian Division.

INFORMATION.—The G.O.C. Army Corps intends a series of operations on August 6th; his objective is the line GABA TEPE, CHUNUK BAIR and thence along the CHUNUK BAIR RIDGE to, and including KOJA CHEMEN TEPE.

The G.O.C., New Zealand and Australian Division undertakes operations on the 6th-7th August as follows:—(1) With covering forces to attack and hold the line DESTROYER HILL–BEAUCHOP'S HILL.

The force for this movement comprises:—The New Zealand Mounted Rifles Brigade, the Otago Mounted Rifles Regiment and Maori Contingent.

The New Zealand Mounted Field Ambulance is allotted to these troops. The Bearer Division will move forward to collect wounded as soon as possible after daybreak 7th August.

The O.C. Bearer Division will send word to his O.C. when he has found a convenient site for the Field Ambulance and a practicable route for its advance. This site will probably be in the CHAILAK DERE where Brigadier-General Russel collects his men after the attack.

The O.C. Bearer Division should send two messengers at quarter hour intervals to inform his O.C. of above.

The line of evacuation in all cases will be to the nearest Casualty Collecting Station on the beach.

The O.C. Mounted Field Ambulance will inform A.D.M.S. of the hour he moves off, and the number of stretchers he is taking with him.

RIGHT ASSAULTING COLUMN.—The New Zealand Infantry Brigade, one mountain battery, one company of New Zealand Engineers, under Brig.-Gen. Johnson will move up the gullies SAZLI BEIT DERE AND CHAILAK DERE; their first objective is the line Point 161 (80) (K. 6) CHUNUK BAIR head of KUR DERE (81. A. 4); their further objective is the BABY 700. There will be a halt after the first objective has been obtained.

The medical units allotted for this Force are:—C Section New Zealand Field Ambulance and 1st Australian Light Horse Field

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Ambulance. C section will take the area SAZLI BEIT DERE and 1st A.L.H. Ambulance the CHAILAK DERE.

The Bearer Sub-Division New Zealand Field Ambulance and Bearer Division 1st Australian Light Horse Field Ambulance will follow the above Force at daybreak August 7th.

The O.C.'s of these units will send back messengers similarly as directed for the New Zealand Mounted Field Ambulance (above) to inform their C.O. of the advance of the Tent Sections; they must bear in mind that the nearer they get to their final destination, *i.e.*, the heads of their gullies, the better.

O.'sC. will inform the A.D.M.S. of the hour he moves off and the number of stretchers he takes with him.

LEFT ASSAULTING COLUMN.—The 29th (Indian) Brigade, 4th Australian Infantry Brigade, one mountain battery, one company New Zealand Engineers under Brig.-Gen. Cox, will attack KOJA CHEMEN TEPE and will move via WALDEN POINT and the AGHYL DERE. The Medical Units allotted are the 3rd Australian Light Horse Field Ambulance and C Section 4th Australian Field Ambulance.

In the event of the G.O.C. attacking by both branches of the AGHYL DERE, the 3rd A.L.H. Field Ambulance will take the right branch.

The instructions regarding the time of departure and request for Tent Sections is the same as for the RIGHT Assaulting Column.

"A" Section of New Zealand Field Ambulance and 4th Australian Field Ambulance are held in reserve; they must be prepared to move at short notice with only such equipment as can be carried on stretchers. The former will reinforce the left assaulting column and the latter the right assaulting column. They will be asked for by the SENIOR medical officer of the left or right assaulting column by message to A.D.M.S. who will be with G.O.C. at Divisional Report Centre.

The A.D.M.S. wishes if possible, that the two Light Horse Field Ambulances will be able to leave their wounded in charge of the 4th Australian Field Ambulance and New Zealand Field Ambulance, and push on to collect wounded at the final assault; in any case it is imperative for them to keep some portion, however small, for this purpose. The main thing to be kept in mind is that there shall be some portion of a field ambulance able to advance with the troops.

In case of a shortage of stretcher bearers, messages for reinforcements will be sent in good time to A.D.M.S. and it should be made clear where exactly they are wanted.

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The areas to be cleared are roughly as follows:—

New Zealand Mounted Field Ambulance: BIG TABLE TOP (80 C.9); OLD No. 3 POST (80.B.9); BEAUCHOP'S HILL (92 x 7 and 8) and all adjoining slopes.

RIGHT ASSAULTING COLUMN.—C. Section, New Zealand Field Ambulance: Both sides of SAZLI BEIT DERE to CHUNUK BAIR and KUR DERE and finally BABY.

1st Australian Light Horse Field Ambulance: Both sides of CHAILAK DERE TO CHUNUK BAIR and KUR DERE and finally BABY.

LEFT ASSAULTING COLUMN.—C. Section, 4th Australian Field Ambulance: Both sides, left branch AGHYL DERE, KOJA CHEMEN TEPE.

3rd Australian Light Horse Field Ambulance: Both sides, right branch AGHYL DERE, KOJA CHEMEN TEPE.

In case of urgency the A.D.M.S. allows O.C. units to exercise their discretion in calling up to their assistance the A. sections of 4th Australian Field Ambulance and New Zealand Field Ambulance, held in reserve, informing the A.D.M.S. of their action, but they are to bear in mind that the heaviest losses will probably be at the final assault KOJA CHEMEN TEPE (971) and joining hands with the Light Horse Brigade on RUSSELL'S TOP.

The Australian Light Horse Brigade will hold our present position on POPE'S HILL, WALKER'S RIDGE, and will subsequently join in the assault to turn the enemy out of the CHESS BOARD; their line of evacuation will be either by WALKER'S RIDGE, where there will be a dressing station of the 13th Division told off for their use at the bottom of the gully, or NASH VALLEY where B. Section New Zealand Field Ambulance and 4th Australian Field Ambulance are already posted; the latter section must, however, be ready to move at short notice as it may be required for duty elsewhere.

Sections of field ambulances acting independently will keep A. and D. books, and the tallies marked MUDROS for light cases or BASE for serious injuries; M. and B. will suffice in urgency.

The A.D.M.S. feels sure that every wounded man will leave the beach properly dressed, labelled, and given suitable nourishment. Water must be most carefully used; for this reason only the most urgent operations should be undertaken. It is expected that all troops will be entirely dependent on their water bottles for at least eighteen hours.

(Sgd.) N. MANDERS, Col. A.M.S.
Commanding Medical Corps, N.Z. & A. Div.

So far the plans of the new landing and the exact nature of our outbreak had been kept secret by Sir Ian Hamilton's orders,

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so that it was necessary for the A.D.M.S. to explain the situation and to point out the geography of the locality on the new maps, copied from Turkish maps taken from prisoners, as they differed materiallly from the original 1/40,000 map used at the landing, which was inaccurate and misleading. Several matters of importance were discussed: the A.D.M.S. hoped that the first field dressing would be so applied that it would not be necessary to remove it for 12 hours, but he hoped that in the coming movement there would be time to attend to each wounded man without the hurry that existed at the landing. He concluded the conference by expressing his entire confidence in all the medical officers under his command and wished them the best of luck in the forthcoming operation. At the termination of the conference, Lieut.-Col. Begg wrote his orders: He allotted to the right assaulting column—New Zealand Brigade—"A" and "C" section bearers of the New Zealand Field Ambulance. "C" section was to take the Sazli Beit Dere, the bearers under Captain A. V. Short were to follow the assaulting column. The O.C.'s bearer sections were to send back messengers every quarter of an hour to the M.D.S.; "A" section, less bearers, was to remain in reserve at the M.D.S. until receipt of information as to a suitable site for the advanced dressing station, "C" section tent subdivisions would be moved up with portable equipment carried on stretchers, the O.C. A.D.S. to report four hourly after opening. Distinguishing patches and brassards were to be worn. A large white patch was issued to all troops for this operation to be worn on the back near the right shoulder, so as to render it easier for our artillery to recognise their own men in advanced position.

OPERATIONS ON CHUNUK BAIR, AUGUST 6TH AND 7TH, 1915.

4.30 p.m. The action was opened by three battalions of the 1st Australian division who attacked "Lone Pine" and held it against powerful counter attacks; there were heavy losses. The other subsidiary attacks from Quinn's, Pope's, and the Neck were unsuccessful and very costly. The dressing stations and Ambulance bearers in Monash's Gully were fully occupied during that night in clearing to the Australian C.C.S. on the beach.

9 p.m. The main attack against Chunuk Bair was initiated by the New Zealand Mounted Rifles and the Maoris, who took old No. 3 outpost and Big Table Top on the left bank of the Chailak Dere and Beauchop's Hill on the right bank. Following these movements the New Zealand Infantry Brigade advanced up the Sazli Beit and Chailak Dere. The left assaulting column reached

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the Aghyl Dere by 1 a.m. and advanced in the direction of Hill "Q." Cox's Brigade on the right, Monash's 4th Australian Brigade on the left on the southern water shed of the Asmak Dere and heading for the Abd-el-Rhaman Spur. The New Zealand Mounted Field Ambulance Bearers under Major Hand Newton moved out to No. 2 outpost at 9 p.m. Captain A. V. Short followed the Canterburys up the Sazli Beit Dere—thought at this time to be the chief avenue of approach to Chunuk Bair—and established a collecting post at the fork under Big Table Top, where he was in touch with the Canterbury R.A.P. His line of evacuation was to Walker's Ridge, M.D.S.

7/8/15. 3.50 a.m. The brigade major of the New Zealand Brigade, Major Temperley, reports many wounded in the Chailak Dere and that stretcher bearers are required. An hour later the 1st Australian Light Horse Field Ambulance with 25 stretchers was on its way up the dere. About this time wounded were coming down to the M.D.S. from Walker's Ridge as a result of an attack on the Neck by the 8th Australian Light Horse who had extraordinarily heavy casualties, the greater number being killed. "B" Section of the New Zealand Field Ambulance in Monash Gully was still fully occupied by casualties from Quinn's and Pope's.

By 6 a.m. on the 7th, the New Zealand Infantry had joined hands about Rhododendron Spur and the Apex. Some of the Gurkha Brigade were on the left—all were preparing for the final assault of Chunuk Bair. In the early morning light the New Zealand Brigade on Rhododendron Spur saw a surprising sight: away to the north at Suvla what seemed to be a mighty Armada riding at anchor in the Bay. The secret of the New Army's landing had been well-kept, so far it had filtered only to brigade headquarters. The cheering sight of the new force coming up on their left must have encouraged the tired New Zealanders to push on and hang on to the slopes of Chunuk Bair, the crest line of which was not more than 400 yards away. Some desperate men did push on but were compelled to dig in after meeting an impassible fire from right and left and enduring piteous losses. In daylight no further advance could be made.

6.10 a.m. The A.D.M.S. instructs O.C. New Zealand Field Ambulance and O.C. 4th Australian Field Ambulance—Lieut.-Col. Beeston, A.M.C., V.D.—to move up their parties to the positions already agreed upon. During the night the engineers had erected a small pier at the mouth of the Chailak Dere, for the evacuation of wounded, it was now flying a red cross flag borrowed from the

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New Zealand Ambulance; the pier was in full view of the Turks on Walker's Ridge and at about 1200 yards range. Another pier for wounded had been erected at Walker's Ridge near Mule Gully. Heavy casualties were reported by the O.C. 3rd Australian Light Horse Field Ambulance, who had moved up the Aghyl Dere at dawn and was in touch with part of Monash's Brigade. A section of the 4th Australian Field Ambulance, also, was moving up the dere under heavy fire.

8 a.m. All forward movements had ceased. The Auckland, Canterbury, and Otago Battalions were at the head of the Chailak and Sazli Beit Dere, Wellington in reserve. All attempts to push on had been frustrated by heavy enfilade fire from Battleship Ridge, the main spur, on their right, and by gun fire from the "W" Hills out Suvla way. Our left flank brigades were also temporarily hung up. Divisional Headquarters had moved to No. 3 outpost where there was good cover except from occasional overs from Baby 700 and the ridge above. Colonel Manders now ordered the Tent Subdivision of "C" Section New Zealand Field Ambulance to open at or near No. 2 outpost. The party under Major O'Neil, D.S.O., N.Z.M.C. proceeded to the Sazli Beit Dere carrying equipment by hand, passing in the sap many Turkish prisoners; they opened at about 11 a.m. at No. 2 outpost, where they handled about 30 cases; an emergency tracheotomy was required in one case, a wound of the larynx. The positions of the medical units now were:—

3rd Australian Light Horse Field Ambulance in Aghyl Dere with some portion of the 4th Australian Field Ambulance whose main dressing station was opening in ground very much exposed to fire. The New Zealand Mounted Field Ambulance had a dressing station at the mouth of the Chailak Dere, the 1st Australian Light Horse Field Ambulance, a dressing station half way up the Chailak Dere; the New Zealand Field Ambulance: A.D.S. at Monash Gully, M.D.S. in *statu quo;* C section collecting post in Sazli Beit Dere; A.D.S. at No. 2 outpost. The locations of the R.M.O.'s were: the Mounted Brigade R.M.O.'s and R.A.P.'s at Big Table Top; and near Beauchop's Hill, where one of them captured 17 prisoners; Captains Guthrie, N.Z.M.C., and Buchanan, N.Z.M.C. were in touch with the Australian Ambulance near Waldren's Point. Most of their wounded were evacuated by 8 o'clock. As regards the R.M.O.'s of the Infantry Brigade the following narrative of Captain Baigent throws some light on the situation:—"At 10.30 p.m. on the night of the attack, the Otago Infantry leading, the Wellington and Auckland Battalions started

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to move up the dere. As soon as we got to the barbed wire entanglements across the mouth of the gully we had casualties which I sent back to No. 3 outpost, where Major M. Holmes [acting D.A.D.M.S.] took them over. I followed up the Battalion to a point just below Table Top where there was a Turkish bivouac. I fixed up my R.A.P. in a Turkish kitchen where I found a Red Crescent dressing haversack made of canvas. It contained dressings, iodoform, morphia, a hypodermic syringe and tallies for the wounded just like ours except that the inscriptions were in Turkish. I dressed a number of wounded and after daylight, as no more were coming in, I went up on to Table Top where I met McLean [Capt. H. J. McLean, N.Z.M.C., R.M.O., Wellington Mounted Rifles]. Shortly after I had returned to our R.A.P. Captain Fiaschi, A.M.C. of the 1st Australian Light Horse Ambulance with bearers arrived; he took over my post, I went on up further and established my R.A.P. near the Apex under the lee of Cheshire Ridge [right bank of Chailak Dere overlooking the Farm]. I had no map, I had not been instructed in any way as to the disposition of the field ambulances. My battalion by now had moved across the Apex to Rhododendron Spur. It was not possible to collect the wounded on the Apex by daylight." Rhododendron Spur was at the head of Sazli Beit Dere and separated by a deep ravine from the main crest in front, called at this point Battleship Ridge. Prior to our advance the Spur had been named "Rhododendron" because of the flowering shrubs which could be seen to be growing there—a species of Daphne—after the advance, the name "Canterbury Slopes" was substituted but did not stick well.

At the mouth of the Chailak Dere there was a small olive grove and some dead ground where the wounded soon collected; the New Zealand Mounted Field Ambulance had an operating tent pitched and was working at this point at an early hour. Before 10 o'clock bearers from the New Zealand Field Ambulance under Major O'Neil passed this point on their way to Aghyl Dere where they collected wounded from about Beauchop's Hill carrying them down to the barges loading at the pier, at No. 3 outpost, or handed them over at No. 3 outpost. These wounded were mainly Gurkhas. Owing to lack of barges evacuations from the small pier were being delayed and a very considerable congestion of wounded took place in the dry water course.

10 a.m. Stretcher bearers were urgently required at Pope's Hill, much congested with wounded. Colonel Manders having his hands full applied to the A.D.M.S. Australian Division for

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bearers to be sent to Pope's Hill. Colonel Howse, V.C., replied shortly that he was sending a Divisional Sanitary Officer and some bearer squads. Owing to the growing congestion at the Chailak Dere, the A.D.M.S. recalled O'Neil's party from the Aghyl Dere.

The Naval Transport Officer, Lt. Greenshields, R.N., working the small pier as N.T.O. was short of barges for evacuation. The pier, a small not very stable trestle arrangement was under rifle fire; there was some shelling at the mouth of the Dere; the wounded were lying on stretchers near the pier under the scanty cover of the sand banks. Major Newton whose dressing station was hard by, had two of his wounded killed and six patients wounded a second time besides some of his staff hit.

Up at the Apex, the wounded of the Gurkhas and the Aucklanders were lying out on the forward slopes where the daylight attack on Chunuk Bair had been arrested. Many wounded were awaiting evacuation; stretcher bearers were urgently required by the New Zealand Brigade Headquarters shortly after 1 o'clock. The A.D.M.S., still persuaded that the main flow of wounded should come down the Sazli Beit Dere, orders Major O'Neil and his party to proceed to the collecting post in that locality, but shortly after was informed as to affairs at the head of the Chailak Dere by receiving the following message from Major Helsham, A.M.C., of the 1st Australian Light Horse Field Ambulance, timed 1 p.m. "I am advancing my post to what was the R.A.P. near the head of the Chailak Dere [Baigent's Turkish Kitchen]. I think it will take to-day and to-night to evacuate the cases there and I will employ this unit for that purpose, as many casualties are expected in the evening; could I be supplied with fresh bearers and as many stretchers as possible"? The A.D.M.S. replies to Brigade that he will do what he can.

By 2 p.m. Major Murray reports from Pope's A.D.S. that he has evacuated 173 casualties since 5 p.m. on the 6th and that his station is clear. But the A.D.M.S. cannot as yet avail himself of the services of the N.Z.M.C. party at Pope's Hill, because, by the plan, the New Zealanders on Chunuk Bair, once the crest was firmly held, were to sweep southwards along the main crest, Battleship Ridge, descending upon Baby 700 and Pope's Hill, driving the Turks before them. It was thought that this movement would be the bloodiest work of the whole engagement, as the Turks were well entrenched, and that wounded would be evacuated in very large numbers through Monash's Gully.

By 3 p.m. both Aghyl Dere and the Chailak Dere appeared to be choked with wounded. The 4th Australian Brigade wired to say

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that they had seen nothing of their field ambulance, the 4th Australian, although they were in touch with Capt. White, A.M.C. of the 3rd Light Horse Field Ambulance, whose small party had had two killed and three wounded, and were by now exhausted; they also reported a shortage of stretchers. The 4th Field Ambulance much congested with wounded could not advance further up the Dere, they were held up by fire; the 4th Brigade was a long way to their left on the Asmak Dere.

From Major Helsham, A.M.C., 1st Australian Light Horse Field Ambulance, halfway up the Chailak Dere, a further report comes late in the afternoon: that he has urgent need of bearers and stretchers as carrying to the beach wastes much time. To this the A.D.M.S. replies:—"Do not evacuate but concentrate wounded, all evacuations to the beach are interdicted until 8 p.m." Fresh troops from the reserve were moving up the Chailak and Aghyl Dere to reinforce the attackers against the final push timed for the grey of dawn on the morrow; up through the rugged torrent bed, water, ammunition, rations and reinforcements were mounting in a solid, slow-moving surge. After sunset, men and mules choked the narrow tracks, opposing all beachward movement. Here were Welshmen, Auckland cavalry, Maoris, men of Worcester, Sikhs and Gurkhas, struggling upwards, bound for the top of the Dere, where at the "Apex" men jostled in bunched up masses, some in dead ground, some on the reverse slopes, an easy target for the guns near Anafarta. No getting the loaded stretchers down through this mass of men and mules.

At the main dressing station at Walker's Ridge, Lt.-Col. Begg had 200 casualties for evacuation; a pier had been built at the foot of Walker's Ridge—Walker's Pier—but the pinnaces and boats could not reach it at present owing to the state of the tide. No C.C.S. had as yet arrived. The M.D.S. must remain where it is for the present. Only walking cases could be got rid of during the day. Major O'Neil opened his tent subdivision in Sazli Beit Dere where he handled some 30 cases during the night. He had been relieved by a small party of bearers of the 40th Field Ambulance, 13th Division, who formed a collecting post at No. 3 outpost.

In the evening Major Helsham realised that he could not get his wounded away that night. Many had been lying out in the open and had not had any food since the previous evening. They had been fighting in their shirt sleeves and had no greatcoats. He wires now at 6 p.m. for 100 blankets, water and some cases of milk and arrowroot.

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Evacuation at No. 3 pier was resumed at 8 p.m. Capt. Finn, N.Z.M.C., Dental Surgeon attached to No. 4 Australian Field Ambulance with the N.T.O., Lieut. Greenshields, R.N., were working together at this point under great difficulties in a spatter of overs from Battleship Ridge. The picket boats could not get to the pier on account of low water, they had to use ships' boats—25 sitting cases to the trip. Up to 10.40 p.m. some 350 sitters had been shipped away; it was impossible to load stretcher cases. It was proposed that the orderlies should wade out into the water so as to load the pinnaces; pinnaces could only take two lying cases at a time. The N.T.O. had wired for horse lighters or motor driven lighters, the famous "Beetles" used for landing troops at Suvla was what he wanted as they had a draw bridge at the bows which could be let down on touching bottom, and they would have taken a very large number of stretchers. The A.D.M.S. after a conference with the N.T.O. strongly represented to Corps Headquarters that if even the posse of stretcher cases at the pier was to be dealt with that night he must have the large lighters; the only other alternative was to carry round by the beach road to Anzac. The text of the A.D.M.S.'s message, timed 11 p.m., is as follows:—"Have conferred with the embarkation officer. We concur only possible method of evacuation is by motor lighters or horse boats. It must be done expeditiously as the beach is under fire. Cannot keep wounded longer on shore as stock of medical comforts is getting low."

During the night preparations are in train for the final sweep upwards to Chunuk Bair, at 4.50 a.m. on the 8th. The attack was to be preceded by a heavy artillery bombardment at 4.15 a.m. Over 600 prisoners with several machine guns had been taken during the day, and miles of new territory acquired to give the Anzacs elbow room.

THE SECOND ATTACK ON CHUNUK BAIR. AUGUST 8TH, 1915.

4.50 a.m. The second attack of the New Zealanders on Chunuk Bair on the 8th, headed by Lt.-Col. W. G. Malone, commanding the Wellington Regiment reached the south western slopes of the crest without heavy casualties, the distance they covered was about a quarter of a mile from their assembly point at the Apex. In the centre Cox's Indian battalions were pushing up to Hill "Q" to the N.E. of the farm at the head of the Aghyl Dere. The 4th Australian Brigade, under Monash, had heavy going in desperately confused country, and in attempting to reach Abd el Rhamen Bair, was almost surrounded by a large body of Turks advancing against their left flank. They had posted a stout rear guard, however, and under cover of this detachment, the brigade extricated itself, regaining its point of departure with 1000 casualties.

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5 a.m. Prior to this hour the A.D.M.S. proceeded up to the dressing station of the 4th Australian Field Ambulance in the Aghyl Dere where he found that the 3rd Light Horse Ambulance had moved into "Australia" Gully, a north running branch of the Aghyl Dere, and had formed an advanced dressing station, and were evacuating wounded from Monash's Brigade to the dressing station of the 4th Australian Field Ambulance at the junction of the Aghyl Dere and Australia Gully. At 7.30, while Col. Manders was still away, the Acting D.A.D.M.S., Major M. Holmes, had the following message from the New Zealand Infantry Brigade Headquarters established just below the apex. "Evacuation of wounded still very difficult. There are no bearer subdivisions. Wounded have to be carried by regimental stretcher bearers to the dressing station over a mile and a half distant [means down to No. 3 outpost]. Prompt despatch of bearer subdivisions to connect with regimental aid post is most pressing necessity." Major Holmes instructs the O.C. New Zealand Mounted Field Ambulance to send four stretcher squads of four men with an officer to assist the New Zealand Brigade. Major Newton had by this time moved his dressing station to "Chalk Hills" a bluff at the western extremity of Beauchop's Hill, immediately north of the opening of the Chailak Dere; he promptly complied with the order given. Further the D.A.D.M.S. notified the A.D.M.S. of the 13th Division that the New Zealand Infantry Brigade was urgently in need of stretcher bearers and asked that 20 bearers might be despatched to the A.D.S. at Major Helsham's post.

Very few casualties had passed through the M.D.S. at Walker's Ridge during the night; by 9 a.m. on the 8th some 50 cases were awaiting evacuation; a few bearers from the 41st Field Ambulance —13th Division—were assisting. "C" section was still in Sazli Beit Dere about half a mile from the mouth, "B" section still complete at Monash's Gully A.D.S.

Very heavy fighting was going on all along our front, the Wellingtons and the 8th Worcesters, with other troops assisting, were digging in as best they might to secure a precarious footing on Chunuk Bair crest under a wicked fire from all quarters; all forward movement had ceased—Malone of Quinn's the hefty leader, was dead, and with him most of the Worcester officers besides many others, the wounded lying thick about the the Apex and in No Man's Land between it and the forward trench line. A further message from Major Helsham gives a clear impression of the medical situation. "9.30 a.m. There are at present no relays of bearers to take over wounded from this station at the head of the

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Chailak Dere. My men have been working continuously for two days and late into the night. The station is overflowing and fresh cases are coming in all the time. We cannot possibly carry the wounded all the way. Please arrange for more bearers to bring two stretchers per squad to keep things going. The O.C. of the 41st Field Ambulance cannot assist us any longer." No doubt he was fully occupied with the wounded of his own Division, 8th Worcesters and the Welsh Pioneers. In answer to this message 50 bearers were despatched at once by the D.A.D.M.S.

The 40th Field Ambulance of the 13th Division which had relieved Major O'Neil at No. 3 outpost at dark on the previous evening, collected, fed, and dressed some 350 cases during the first twelve hours they were evacuating to the pier. There was now an increasing congestion of wounded about No. 3 and No. 2 outposts. Affairs were not going well at the Red Cross Pier; there was serious congestion at the mouth of the Dere, the enemy fire was holding up evacuation. The N.T.O., Mr. Greenshields was killed before noon. Capt. Finn, N.Z.M.C., remained on and took his place.

Col. Manders was nearly the whole forenoon in the Aghyl Dere sector where exceedingly heavy casualties were occurring and where no less than five ambulances were working. There were the 3rd Australian Light Horse Field Ambulance, the 4th Australian Field Ambulance, the Indian Field Ambulance, the 39th Field Ambulance of the 13th Division and part of the 41st Field Ambulance. The D.A.D.M.S. of the 13th Division was at Waldren's point, where the 39th Field Ambulance had their M.D.S. More serious losses were being met with in this area than in the Chailak Dere, at least three brigades and part of a fourth were heavily engaged. The ambulance bearers were suffering considerable casualties; the Dere at its upper end completely open to fire and observation. Major Holmes now though it wise to bring the New Zealand Field Ambulance into action in the Chailak Dere—where as yet only the 1st Australian Light Horse, part of the New Zealand Mounted, and a party of 41st Field Ambulances were working. Lt.-Col. Begg reported at 10.45 a.m. that he could spare about 12 men with six stretchers, that "C" section are not very busy having dealt with only 58 cases since they opened on the night of the 6/7th, and that he thinks "B" section could be used also, as affairs, are not pressing at Monash's Gully.

The Medical position at noon was this:—A.D.M.S., Col. Manders, had now about 600 casualties mostly stretcher cases for evacuation. No. 3 pier was working fitfully under great difficulties; the mouth of the Chailak Dere, No. 3 and 2 outposts, were choked with stretcher

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cases. Anzac wired to say they were full up and to send down no more stretchers at present; the C.C.S. promised had not arrived. At No. 2 outpost 300 wounded were being tended, to some extent, by the 40th Field Ambulance bearers less two officers and 30 men despatched to the Aghyl Dere during the forenoon. The C.C.S. is urgently wanted. Col. Manders wires the D.M.S. to that effect. To those who knew the western front with its clockwork methods of evacuation all this may appear very confused, very inept, but having in mind the limited means available for the evacuation from the beaches and the usual difficulties of amphibious warfare, and the fact that a landing at Suvla was in progress and the absence of any form of wheeled transport and the very limited communications—through one narrow sap—it would appear that the block was inevitable.

By midday the battle is easing down. On Chunuk Bair the remnants of the assaulting column, who by now have lost nearly every officer, are still hanging on. At Lone Pine on our right fierce fighting is still in progress since the afternooon of the 6th. The Turks seem to be shaping up for a counter attack at the head of Monash's Gully, the loss of which would have disastrous results. The A.D.M.S. cannot afford to take any bearers from the A.D.S. at Pope's Hill, Murray and his section are ordered to stand fast; the main thing is to get the C.C.S. ashore. But by 5 p.m. affairs appear to be very bad both in the Aghyl and Chailak Dere. Lt.-Col. Beeston, A.M.C. has succeeded in pushing "C" section of the 4th Australian Field Ambulance further up the Aghyl Dere; the A.D.M.S. of the 13th Division has sent up some more bearers to the assistance of the 4th Australian Brigade whose losses are pitiable. Major Helsham is again asking for assistance—a few bearers from the 40th Field Ambulance proceed to the dressing station of the 41st; the A.D.M.S. now determines to utilise "C" section of the New Zealand Field Ambulance, he accordingly sends orders to Major O'Neil:—"Proceed with your section to the head of the gully, get into touch with General Johnson [commanding New Zealand Brigade], and advise in the morning how many stretchers you require to evacuate to the beach." "A" section bearers had fortunately just cleared O'Neil's A.D.S., he did what he was ordered to do and proceeded to the head of the gully he was in, namely the Sazli Beit Dere. The intention of the A.D.M.S. was not clearly shown in his order. Nor is there any means, now, for determining what his intentions were. But it would seem that the better disposition of the party would have been in the Chailak Dere.

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We will now follow the adventures of Capt. Baigent, on the 8th. "I shifted my R.A.P. up to the Apex, my battalion was in reserve. Padre Luxford was with me"; [we remember him at Helles], "we took cover in the scrub which was very tall. It afforded concelment from "W" hills. During the day I had many wounded through, and Padre Luxford was wounded." He lost his leg by this wound; and later at No. 2 N.Z.G.H. was chaplain, held in much awe by those who had not been to Gallipoli. He died in New Zealand after a long and very painful illness, much honoured, his memory ever green to those who saw his tireless devotion to the wounded at Anzac and Helles. Capt. Baigent continues: "The wounded were carried down by the regimental stretcher bearers as far as the A.D.S. of the 1st Australian Light Horse Ambulance, at the old Turkish bivouac, where I had my first R.A.P. Home, Pearless and Craig were up at the Apex too. No rations, no water had reached the battalion when they moved up at dark to dig in."

The military situation of the New Zealanders on the evening of the 8th is, in tabloid form:—The New Zealand Brigade with the Auckland Mounted Rifles, and the Maori Contingent, are holding Rhododendron Spur and the reverse slopes of the south western end of Chunuk Bair. There is great difficulty in supplying the firing line, 400 yards ahead of the Apex, with guns, ammunition, water and communications. Adequate consolidation of this line is impossible, the trenches in some places are only a few inches deep. The main avenue of approach, a very narrow track through the Chailak Dere, is under direct observation of the enemy, and impossible for large bodies by daylight and by nightfall congested by stretcher parties, mule transport of the Indian S. & T. carrying water in fantassahs, ammunition boxes, and supplies; wounded side tracked everywhere, making progression impossible at times. Heavy cross fire by artillery and rifle fire on the upper slopes still further delay the arrival of water, ammunition, tools and reinforcements. On our left Cox's Brigade, the 4th Australian and the 39th Infantry Brigade of the 13th Division are as badly off. The Aghyl Dere is so open as to be unsafe to move in by daylight. They are holding on there with heavy losses. The force at Suvla which was ordered to seize Ismail Oglu Tepe—the "W" hills from which our advance on the heights is enfiladed by the Turkish artillery—has not been able to be of any assistance and have not as yet joined hands with Monash. Fresh plans for a final assault are drafted. A new brigade—Baldwin's—of five battalions, all of the 13th Division, drawn from the corps reserve is to pass through our firing line at Chunuk Bair. Cox is to assault "Hill Q," joining hands with

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Baldwin's columns who have the same objective midway between Koja Chemen Tepe and Chunuk Bair. The attack is timed for 5.15 a.m. on the 9th.

By 8 p.m. Baldwin's battalions were entering the mouth of the Clailak Dere. The A.D.M.S. was instructed that the Dere must be kept free of stretcher parties during this phase in order to give Baldwin's column a clear passage to the Apex. General Godley in his report on the August fighting says "with this object" [giving Baldwin a clear passage] "arrangements were made for the narrow track to be kept clear of all obstruction such as wounded coming down, rations going up, etc." With the tramp and dust of Baldwin's men assailing his jaded senses, Colonel Manders sits at his dug-out door powerless to help. His last reserves of stretcher bearers are in, his hands all tied by the necessities of the military needs. About him is a dust-grey welter of wounded, half naked, hungry, thirsty and forlorn, the tiny handful of the 40th Field Ambulance quite inadequate to help even a moiety of these sufferers of all races—water even is scarce. Blankets, there were practically none; most of the Anzacs, lying out on stretchers without shelter had fought all day in their shirts; the night was chilly; many had been lying there for over 24 hours. With a sad heart the A.D.M.S. turned to his own diary written for his family alone. "The lines of communication have been broken down," he writes, and a little further on, "completed 31 years of service—only one more"!

Now hear the story of the missing C.C.S.: it arrived off Anzac at 2 a.m. on the 7th August on the *Ikalis*, which also had the 16th C.C.S. aboard. They waited and signalled, but no lighters came off—they went to Suvla—there were no orders for them there. Lieut.-Col. McNaught, R.A.M.C., O.C. 13th C.C.S. was permitted to wire his whereabouts to the A.D.M.S. of the 13th Division, and on the 8th had orders to disembark on "A" beach at Suvla, where from is not clear. Both commanding officers duly disembarked at Suvla to be told by the beach master that they were both wanted at Anzac. On arrival at Anzac, Colonel Keeble, A.M.S., now acting as D.D.M.S. ashore, ordered Lieut.-Col. McNaught to proceed to No. 2 post. On arrival he found the 40th Field Ambulance bearer parties there, and noticed a small and flimsy pier with a red cross flag flying, being shelled; he also noticed one of our batteries just in front of it. He did not see Colonel Manders. His equipment was over a mile away at Anzac, no transport could be got that night; the beach road could not be used by daylight—that night it was choked with Baldwin's

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mulecarts—but transport was promised for the following night. Accordingly he brought up 3 officers with 20 men and what equipment they could carry to assist the ambulance bearers that very night.

Out in No Man's Land between the fire trench and the Apex, the R.M.O.'s and their stretcher bearers spent most of the night clearing the slopes of the wounded of four brigades.

THE FINAL ASSAULT ON CHUNUK BAIR. AUGUST 9TH, 1915.

4.30 a.m. The final assault on Sari Bair was delivered after a heavy bombardment by all available guns and ships; the 6th Gurkhas achieved the heights from which they overlooked the Narrows. Baldwin's column arriving late, delayed by traffic, in the dere—8 hours marching 2000 yards—deployed in daylight only to find the crest lined by the enemy in strength, the Gurkhas hurled off the heights, and the battle lost. The New Zealanders whose orders were to stand fast until Baldwin touched their left were the pivot of manoeuvre. The pivot remained, the manoeuvre had failed. The New Zealanders held what they had gained, but the doom of Anzac was sealed. Col. Neville Manders, A.M.S., A.D.M.S. to the New Zealand and Australian Division, crept out of his bivouac early on this fateful morning only to meet his end. A wandering bullet pierced his head, he fell forward, and when Major Holmes ran to pick him up he was dead! His many years of faithful service ended. Staunch to the last, he had never faltered—even under the galling yoke of Anzac.

7.30 a.m. Major Helsham reports from the Turkish bivouac "More bearers and stretchers are required on the line between here and the beach. 100 bearers with stretchers are necessary. It is no use clearing this station at present as my line is choked with wounded who cannot be shifted owing to lack of bearers." To this the D.A.D.M.S. replies that stretchers are in plenty at the embarkation pier—that he has no bearers at present but will supply them as soon as possible. Lieut.-Col. Beeston reports that he has moved his "C" Section further forward into a position better suited to evacuation from the 4th Australian Brigade.

8.30 a.m. D.A.D.M.S. requests O.C. New Zealand Field Ambulance to send some bearers to reinforce the 1st Australian Light Horse Ambulance, and despatches an officer with an important message to the D.D.M.S., Lieut.-Col. Keeble, stating that no casualty clearing station had arrived as yet and that he is without means of attending to the wounded at No. 3 and No. 2 outposts, as all his ambulances are fully engaged and that he requires to be cleared.

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9 a.m. The total casualties dealt with at Monash's Gully, A.D.S., since 8 p.m. the previous night, was only 11. Lieut.-Col. Begg, N.Z.M.C., now senior medical officer with the division, is transferred to Headquarters as acting A.D.M.S. Major O'Neil, D.S.O. is to take command of the New Zealand Field Ambulance. The 13 C.C.S. is now coming into action between No. 3 and No. 2 outposts in a depression of a line of low hills 400 yards long and about 30 or 40 feet high, overlooking the beach and the embarkation pier, some two or three hundred yards away. Here the C.C.S. took over from the 40th Field Ambulance a sandbagged shed used as a dressing station and operating room, one large dug out shelter with 5 beds and space for from 15 to 20 stretches. Water in limited quantity was available from a well at the foot of the Chailak Dere. The 40th Field Ambulance had cleared 750 cases in all since it opened at No. 3 outpost. A portion of the unit remained to assist the C.C.S. The remainder went to reinforce other units, the 41st in Chailak Dere, the 4th Australian in the Aghyl Dere. Their casualties for the three days:—2 killed, 4 wounded. The whole detachment numbered 6 officers, and 125 O.R. with light equipment only, and four trained ambulance dogs, evidently the bearer subdivisions, and during the 8th no less than 2 officers, 1 N.C.O. and 73 bearers had been sent forward to the A.D.S.'s, leaving 4 officers and 52 bearers to man No. 3 outpost, where there were estimated to be 600 wounded to carry to the beach. These facts deserve sympathetic consideration because of the complaints made by Anzac Units, at the time, of lack of attention to wounded at No. 3 outpost. Lieut.-Col. Begg in a reply to a query in this matter from the A.A. and Q.M.G. of the New Zealand Division dated 8th August, 1915, remarks that the complaint was mainly well founded, that Colonel Manders had considered the condition unsatisfactory but that the whole trouble was due to the non-arrival of the 13th C.C.S. We have seen how this unit was handled and that it was not in any way to blame for its late arrival, and I have tried to show that the 40th Field Ambulance, a small party of bearers, were of course wholly overwhelmed by the numbers of wounded coming in. They worked for 76 hours on end; they did their best—carried to the pier and to Anzac when the big sap was clear of traffic—drew water—built some sort of a sandbagged shelter—and helped to clear 750 cases under the worst possible conditions. As to the movements of the ambulance dogs, alas, there is nothing told in the diaries.

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3 p.m. A message comes from the New Zealand Brigade Headquarters for more stretcher bearers. The A.D.M.S. orders up "A" section and the new O.C. of the New Zealand Field Ambulance with all equipment that can be carried on stretchers; no transport is available; the bearers of "B" section are to remain at Walker's Ridge; "C" section in Sazli Beit Dere and Brigade Headquarters is notified of the despatch of one section of New Zealand Field Ambulance to assist in evacuations from the Apex. Major Newton, at Chalk Hill, is unable to send reinforcements as his strength is now reduced to 24 men only. 8.30 p.m. Major O'Neil proceeds with "A" section to a position near the Brigade Headquarters in the Chailak Dere and opens a dressing station there. Some details under the Quartermaster Lieut. Sandham, and the dental section—Captain Don, N.Z.M.C.—remain at the M.D.S. at Walker's Ridge, "C" section still in the Sazli Beit Dere.

We will again follow Captain Baigent's diary. "August 9th Major O'Neil came up early this night to assist and the New Zealand Field Ambulance formed an A.D.S. below 'Rose's Hill.' They cleared my R.A.P. The carry down to the C.C.S. was about 1200 yards. At 12 p.m. some of the 5th reinforcements were told off as stretcher parties, they also carried to the beach." The "fighting fifth," who arrived in the heat of the battle, had many casualties and now some of these stout fellows are tasting the full bitterness of war in carrying their mangled comrades back to the beach. Lieut.-Col. Begg at 11 p.m. asked for 100 of these men to carry 50 stretchers to the Apex; the party was immediately despatched. Captain Baigent continues:—"About 1 a.m. [on the 10th] I was dressing a wounded man, one of us was using an electric torch and every time we showed a light it drew fire; eventually I was hit. I was carried down to the C.C.S. where I found a lot of wounded lying about. There were no tents and no blankets, some of the wounded had no clothing on except their shirts, shorts and putties. Later on through the night I was evacuated to Anzac beach."

That night the New Zealanders were relieved on Chunuk Bair, coming back to the main position on Rhododendron Spur, now somewhat more organised as a defensive line. At 1 a.m. on the 10th a further 80 men of the 5th reinforcements were detailed as stretcher bearers and at 3 a.m. Captain A. V. Short with "B" section bearers of the New Zealand Field Ambulance moved out under orders to join O'Neil's party; all wounded in the Chailak Dere were away before daylight.

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At 5.30 a.m. the Turkish counter attack opened, in strength estimated as a division led by Kemal Bey in person. By 9 a.m. they were massing on the forward slopes having driven in the thin line of the New Army Battalions holding the New Zealand Trench on Chunuk Bair. A very determined flank attack was beaten off by Monash's Brigade but the most terrible hand to hand fighting took place about the Farm on the left of the Apex. Here Baldwin was killed. The 5th Wilts. were practically annihilated, the Worcesters and Warwicks left without an officer. All our reserves were in—it was touch and go—but the line held at the Apex and from Cheshire Ridge to Warwick Castle at the head of the Aghyl Dere. By midday all counter attacks had been driven off with very heavy losses on both sides. O'Neil's A.D.S. at the head of the Dere had been withdrawn to a position a little lower down, conforming to the movements of troops now reorganising the position, the Apex now being the most forward point attained in the advance, 500 yards short of Chunuk Bair. Major O'Neil was now made responsible for all evacuations from this area; all wounded coming down were to be supplied with a haversack and water-bottle in order that they might have water and rations issued before they left the beach. Major Murray at the Monash Gully A.D.S. reported all clear by 10 a.m. Things were quiet there, the Lone Pine position was now safe; it had netted some five V.C.'s to the Australians; the Turkish counter attacks which lasted three days had died down.

The 13th C.C.S. was as yet not fully manned, some equipment had been brought up by hand and by transport on the beach road during the previous night. There were now 7 medical officers with about 20 O.R. of this unit at work; 50 fatigue men were added as stretcher bearers. Work on the beach and the pier was dangerous on account of bursts of rifle and M.G. fire from the Turkish lines above—it does not appear that any of this was aimed fire—dropping bullets were falling even in the C.C.S. where men were wounded occasionally. Captain Finn, had much trouble in getting the wounded away from the pier as the boats were small and few. Only an occasional horse barge was available, but from 6 p.m. on the 9th to 6 p.m. on the 10th, 168 lying down and 350 walking wounded got away to sea from this pier. Other walking wounded had been despatched down the big sap towards Anzac where they were handled at Walker's Pier by the 16th C.C.S.; but some 431 stretcher cases remained at No. 13 C.C.S. that night. Three hospital ships sailed on the 9th: *Sicilia*, *Dongola*

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and *Devanha,* tranferring 2,500 cases to the *Aquitania* at Mudros. Only one hospital ship, the *Neuralia* was off Anzac on the 10th.

The three days fighting had cost the New Zealand and Australian Division and the 13th Division 375 officers, and 10,358 O.R. killed, missing, or wounded. The N.Z.M.C. casualties were not heavy: one R.M.O. wounded, one evacuated sick on the 10th. The New Zealand Field Ambulance had four wounded, but the New Zealand Mounted Field Ambulance lost 25 per cent. of their effectives from sickness or wounds.

During the night the removal of the wounded from the slopes of Sari Bair continued. By 4 a.m. on the 11th Major O'Neil reported that there were large numbers of stretcher cases to be evacuated and he asked for strong parties of bearers to be sent up. The A.D.M.S. applied to the A.A. and Q.M.G., Major Bentick, for the necessary men. Tarpaulin shelters and an operating tent had been erected at the C.C.S. but there was still insufficient cover for all wounded, who were coming in very quickly during the forenoon, in spite of evacuation by sea; quite 400 still remained at noon. A message from Colonel Keeble at Anzac states that the navy have sent every available boat, and that he has applied for a motor lighter. There was some improvement in the number of tows arriving after this, but later in the afternoon evacuation from the pier was discontinued after several men had been killed by observed machine gun fire from Battleship Ridge—range, say 1250 yards. It became necessary to evacuate by hand along the sap to the 16th C.C.S. whose pier at Walker's Ridge was safe. For this purpose the 13th Division furnished large parties of infantrymen who carried through the whole night. After dark it was possible to resume work at No. 3 pier. Up to 6 a.m. 209 lying and 492 sitting had been evacuated by sea, many hundreds also by the sap.

On the 12th the collecting station for wounded in the vicinity of the pier had 37 stretcher cases, these were brought up to the C.C.S; the red cross flag which had flown for 5 days on the pier head was struck, as the place was now considered too dangerous for further use. There were about 1000 casualties this day, 380 remaining in the C.C.S. which was not clear until two "Beetles" each capable of taking a very large number of stretchers reported at Walker's pier on the 13th. By this time the battle was over and the military situation had reverted to trench warfare.

In reviewing the medical arrangements and operations of medical troops during this very dramatic period in the history of Anzac

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the machine-made, clockwork precision, and colossal efficiency of evacations of wounded in France must not be compared with these primitive amphibious efforts at the Dardanelles, where lack of sea and land transport were insuperable difficulties. The medical arrangements made for the August Campaign were the outcome of much deliberation, hard thinking and downright gruelling work by the War Office, by the G.O.C., Sir Ian Hamilton himself, by his Administrative Staff, by the P.D.M.S., by the Surgeon General Birrell, and by the Naval Authorities who appointed Surgeon General Sir James Porter, R.N., Principal Hospital Transport Officer, making him responsible for all sea transport arrangements. An estimate of 20,000 casualties was assumed as a basis. Six hospital ships were provided, with thirty hospital transports staffed with medical officers, nurses and orderlies, and equipped with bedding, dressings, drugs and comforts. On the 4th August a conference was held at Army Corps Headquarters at which Surgeon General Birrell, Colonel Manders and Colonel Howse, V.C., were present for the purpose of discussing the medical arrangements. As the forthcoming landing at Suvla and the nature of the operations at Anzac had to be kept secret the subordinate medical officers could not be informed as to the coming moves, but this did not much affect the situation.

Several factors contributed to a partial failure in the evacuations. First, lack of small craft to embark the wounded. Early on the morning of the 7th the Australian and New Zealand Corps Headquarters were requested to communicate with Sir James Porter on board the yacht *Liberty* stating their requirements of tows for the two new piers. We have seen that at No. 3 pier there was a shortage of tows and that the craft was unsuitable. There was of course the tidal difficulty, the slender, inadequate pier, and above all the danger and the loss of life caused by shelling and rifle or machine gun fire. Had "Beetles" been made available at this pier on the 7th or 8th many lives might have been saved as that type of craft was shrapnel proof and could take aboard a very large number of stretchers expeditiously. Men could embark or disembark in fours from these new self-propelling machines, devised especially for amphibious warfare. There must have been a shortage of tows at Anzac at 11 a.m. on the 8th as they wired that they were full up. It is admitted by all competent authorities that tows were insufficient to clear expeditiously on the 8th. The second factor leading to a break down was lack of land transport. So evident was this that the D.M.S. who, with Surgeon-General Babtie, V.C., had considered the

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problem in July, asked on the 11th to have 500 Egyptian bearers sent to Anzac; this request could not be complied with. We have seen that the carriage by hand of such a large number of wounded across our front and through congested traffic in a narrow sap, for a distance of over two and a half miles, approximately, would necessitate the employment of a very large number of bearers which at first were not available from medical personnel, and could not be reasonably asked for from fighting troops, of which a minimum only could be utilised in the main operation owing to poor water supply and insufficient communications, and more especially as the capture of Chunuk Bair—the vital issue—was in suspense for three days. The late arrival of the C.C.S. was of little moment as compared with these factors. A C.C.S. requires space, time, and liberal equipment to develop its usefulness. It could not do at No. 3 post what apparently was expected of it—short of equipment—short of shelters, tents and its other cumbersome paraphernalia—and, above all, short of personnel. Our memories of a C.C.S. in France with its adequate appliances, its fine surgical teams, its highly organised administration, good buildings, hutments or tents with a luxurious ambulance train drawn up in the hospital siding—all the product of weeks of preparation and months of training—must not obtrude in a survey of the work of the 13th C.C.S. at No. 3 post on the bullet swept corner of a crowded, dusty beach, the seaward part of which was under clear enemy observation and impracticable by daylight. That the wounded were subjected to hardship of a serious nature when congested at No. 3 outpost on the 7th, 8th, and 9th there is no doubt: that there were many complaints both at the time and afterwards is true. The best commentary on the matter is contained in the following extract from a letter written by Lieut.-Col. Begg, who was an eye witness. He says, some months later:—"It is quite possible that some wounded remained for three days at No. 3 outpost as the whole of the sea front was subject to shell fire and machine gun fire and it was impossible after three days to get wounded away by sea from this point. All carriage was by hand through narrow saps and trenches and in this manner many thousands were conveyed to barges. Of those who stayed on the beach for some days, many were slight cases who had to give way to the more serious; others were so seriously wounded that they had to be left undisturbed if possible. Many of these would have died during the handling necessary to get them to the beach. The personnel of the British Casualty Clearing Station worked for days without rest and I can give assurance

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that everything in human power was done by those on the spot not only to remove all wounded men with rapidity but to relieve suffering to the utmost possible extent."

The final report of the Dardanelles Commission sums up the matter thus:—"The evacuation was carried out in accordance with Sir James Porter's dispositions, and on the whole the cases were better sorted than in the original landings, but there was still considerable confusion... The scheme for the evacuations in August was based upon an approximately correct estimate of casualties, and the supply of hospital ships was much larger than that at the first landing. On the whole the scheme worked well, though again there were cases in which the transports were not satisfactory and the organisation for transferring the wounded to the ships was imperfect."

That the operations were on a much larger scale than at the landing is shown by a comparison of casualties. The British losses for the landings from the 25th April to the 20th May, 1915, are given in Sir Ian Hamilton's first despatch:—

Total killed, wounded and missing ..	14,089
Wounded evacuated	8,219

whereas the total evacuations in 26 days from the Peninsula between the 10th August and the 5th September, 1915, are estimated roughly by Surgeon-General Babtie, V.C., in his report as 50,000: 30,000 wounded, 20,000 sick, and he comments upon the evacuation by noting "that great as were the difficulties ashore the provision of adequate sea transport was just as difficult." 25 transports were ultimately used, of these only one was not provided with staff, equipment, and nurses." As evidence of the severe nature of the fighting, the following statement of casualties in the New Zealand Brigade alone is eloquent.

CASUALTIES REPORTED BY THE NEW ZEALAND INFANTRY BRIGADE FROM THE 6TH TO THE 14TH AUGUST, 1915.

	Officers	O.R.
Killed ..	11	278
Wounded ..	43	988
Missing ..	6	388

Total casualties, 1714, about 50 per cent. of the effective strength of the Brigade.

The remainder of the month of August was taken up in consolidating and improving the defensive position which was not completely rectified until a "minor" operation, in which New Zealand troops co-operated, had added some 460 acres of territory

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to what we had gained and welded our line firmly to that held by the Suvla Force.

OPERATIONS AT HILL 60. AUGUST 21ST TO 31ST.

The Kaiajik Aghala, known to us by its contour as Hill 60 was held by the Turks and endangered communications between Suvla and Anzac besides dominating important wells as Susak Kuyu. It was determined to attack along an extensive front with this hill as the right pivot on which the Anzac left was to be directed while the 29th Division attacked the "W" Hills, the chief thorn in the side of Anzac. New troops were landed at Suvla including the 29th Division brought up from Helles. The New Zealand Mounted Rifles the New Zealand Engineers and the 3rd Australian Light Horse Ambulance were to be part of the Force under General Cox who had two infantry Brigades including the 4th Australian and his own Indian Brigade, all very much below strength of course. The O.C. 4th Australian Field Ambulance was to detail 2 bearer sub-divisions to clear their own Brigade, and the 3rd Australian Light Horse Ambulance was ordered to use their bearers in clearing one of the British Battalions of the 13th Division. Both ambulance parties assembled in Australia Gully and had orders to evacuate wounded to a newly erected pier opposite Waldren's point. Australia Gully, a tributary of the Aghyl Dere, lay to the west of the Damakjelik Bair and led up to the water shed of the Kaiajik Dere across which, to the north, lay Hill 60. The distance to Waldren's point would be over a mile, the open ground closely searched by rifle fire and shrapnel.

3 p.m. After a heavy bombardment of "W" Hills and neighbourhood, very little of it falling on Hill 60, General Russell's mounted men moved out to the attack descending into the deep gully to assault several parallel trenches on the hillside opposite. The 4th Australian Brigade were on their right, the Indian Brigade on their left. The N.Z.M.R. captured and held two lines of trenches; the 4th Brigade held a precarious footing on the same side of the dere. The Suvla Force had no luck—the 29th Division suffering heavily. Secure touch on our left was not yet established.

At 6.45 p.m. the O.C. No. 4 Australian Field Ambulance reported that as two of our guns were in action near the new pier opposite his M.D.S. at Waldren's point, the pier had become inoperable for the evacuation of wounded. He protested against using a red cross flag in such close proximity to the guns. The A.D.M.S. instructed him to evacuate to the 16th C.C.S. at No. 3

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outpost. Casualties were heavy during the Turkish counter attack and at 9 p.m. there was a call to reinforce the bearers. General Monash could not afford one man, his much overworked and overfought brigade numbered at this time only 1,500 men, and every man was wanted in the firing line. Fortunately the 5th Australian Field Ambulance, newly arrived at Waldren point, were able to send 40 bearers. The 3rd Australian Light Horse Ambulance bearers who had been instructed to clear the wounded of the South Wales Borderers reported to them in due course only to find that this Battalion had instructions to clear to the 39th Field Ambulance. Captain Cave, A.M.C., O.C. 3rd Australian Light Horse Bearers, finding that no special bearers had been detailed to the N.Z.M.R. Brigade promptly decided to clear their wounded. The line of evacuation now being—A.D.S. in Australia Gully to M.D.S. at Waldren Point—4th Australian Field Ambulance—to 16th C.C.S. at No. 3 Outpost or the pier—which became operable at night—carry say 3000 yards. 662 casualties were cleared by midday on the 22nd. A vivid pen picture of a regimental medical officer in action is given in a contemporary diary of one of the R.M.O.'s of the N.Z.M.R. Brigade, in which the fighting of the 21st and 22nd is in part described, and for the use of which I am much indebted. I quote the entry of 21st August, 1915.

"My regiment was detailed in conjunction with another regiment to take a sector of trenches on a hill to the north about 500 yards away as the crow flies. There was a preliminary bombardment of the trenches which was supposed to demoralise the enemy. The 4th Australian Brigade were on our right, the Connaught Rangers on our left, the latter had to take a well 200 yards away from our trenches. After the bombardment the men jumped out of the trenches, casualties commencing right away. Fire was coming in pretty hot on the parapets. Waiting for a comparative lull I took my chance, the S.B.s [regimental stretcher bearers] followed on my heels. We had to get down the hill 30 or 40 yards to get any material cover. Behind a bank 10 yards from the trench we got a man hit below the clavicle, he was not bleeding and was under cover. A S.B. was detailed to put on a dressing. Remainder made another bolt, Smith got winged in the leg, died afterwards, poor fellow—compound fracture. I was down in the scrub just getting below cover when I got hit—absolutely fatal luck. I knew I was hit in the back of the neck. I retained consciousness but my legs and arms were not under control, they were moving in vermiform

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fashion *a la* Maude Allen, I could see my fingers and hands working, and I had a sensation as though I were a glove being vacuumised. I tried to move myself to better cover, but could not do so, so I resigned myself and lay down to it. In a few minutes life came back into my limbs and I tried my legs and arms, and found I could move them. I then realised that the temporary paralysis was due to spinal concussion." [He was wounded in the occipital region through and through below the Ligamentum nuchœ.] "A stretcher bearer crept down to me and fixed me up with a field dressing. I sent the S.B.'s on and later got down the gully into cover. The S.B.'s had selected a good place and I got into it and fixed up a fellow with a shattered shoulder. I decided to make this place the regimental aid post and eventually got together about 25 cases. Captain X... made along about this time; he gave an anaesthetic whilst I reduced a large portion of eviscerated gut and plugged the wound. At dusk we sent some slightly wounded men to get into touch with the Ambulance. Captain Cave, A.M.C. came over himself, went back and brought his bearers, my own regimental stretcher bearers were away to the front by this time, having cleared the ground in the vicinity of the post. Got the post evacuated by 8 o'clock. I then borrowed two squads [3rd Australian Light Horse Field Ambulance bearers] and went forward. Came on another batch, about 20, which the S.B.'s had got together; got them away quickly, mostly walking, then made forward with two of my own squads up to within 20 yards of the trench we had taken and found a good protecting bank under which Norris was lying in charge of some wounded Maoris. Here I got into touch with trooper White who had gone away back for stretchers. He had localised about 15 stretcher cases and was working anywhere and everywhere regardless of fire and risk. S.B. Parker had collected nearly 30 cases and set up an aid post of his own; he had all his walking cases away and was left with 11 stretcher cases and there were 4 cases in the trench. I had arranged for a rendezvous of Australian bearers and sent back a man to hurry them up. All cases, as far as we knew, were localised, and evacuation was proceeding as satisfactory as possible. There was a large percentage of compound fracture of thigh, and many of them were terrible smashes. Small entrance holes, bone in splinters and large exit, the bullet had stripped nearly all the muscles on the opposite side of the limb right away. Holes you could put your two fists into. Explosive bullets I am sure."

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The diarist corrects this statement by saying that the Turks turn their bullets the wrong way round. All this very interesting as exemplifying current opinion. The Germans said the same thing of us in 1915. It was clearly shown that the modern "humane" pointed projectile is at moderate ranges infinitely more destructive on account of its momentum due to high velocity and its shape and composition that the larger, more slowly moving projectile of earlier wars (see Delorme War Surgery, 1915, for a full discussion.) The diarist was relieved by another medical officer and got away safely to a hospital ship, his concluding remarks deal with the Light Horse Field Ambulance. "The 3rd Australian Light Horse Field Ambulance were splendid fellows, Captain Cave and his bearers coming up at the critical time."

We have seen that both the Australian Light Horse Ambulances played a valuable part in the August medical operations. In this engagement the N.Z.M.B.F.A. sent up a party on the 22nd clearing to their M.D.S. at Chalk Hill. On the 22nd further heavy fighting took place at Hill 60 during which the R.M.O. Wellington Mounted Rifles Captain H. J. McLean, N.Z.M.C. was severely wounded. The 15th Battalion A.I.F. also lost their R.M.O., Captain Luther, A.M.C., killed in action; a very valued officer.

The final assault on Hill 60 took place on the 27th: the N.Z.M.R., the 10th Australian Light Horse and 2 Australian Infantry Brigades, the 4th and 13th co-operated. The fighting throughout was of a hand to hand nature with bayonets and bomb and lasted two days: there were heavy casualties. The net result was an almost complete occupation of the disputed hill trenches and a firm conjunction with the Suvla force.

The A.D.M.S., Lieut.-Col. Beeston, V.D., A.A.M.C., late O.C. 4th Australian Field Ambulance who succeeded Lieut.-Col. Begg, N.Z.M.C. evacuated wounded 16th August, 1915, issued medical operation orders for the engagement of this date. In anticipation of the attack, O.C. 16th C.C.S., who had relieved the 13th C.C.S., had established an advanced evacuation station at the pier opposite Waldren's point. Severe lying cases were to be carried to the C.C.S. at No. 3 outpost in view of surgical treatment. The N.Z.M.B.F.A., the 3rd A.L.H.F.A., and the 4th Australian Field Ambulance now had posts at the head of Australia Gully, and as the attacking force from the Australian and New Zealand Division was only 1000 strong it is seen that a sufficient number of bearers was available.

Some time after the attack Lieut.-Col. Thomas, N.Z.M.C. commanding the N.Z.M.B.F.A. was killed while leading

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stretcher parties to the vicinity of Hill 60. He had entered the sap leading to the fire trenches, the shell fire at this point was heavy, eventually a shell burst immediately over the party, the leader was killed instantly by concussion, and four of his bearers were wounded by the same explosion. Lieut.-Col. Thomas had been in Anzac about a fortnight. His body was buried in front of the main dressing station of his ambulance at Chalk Hill. Later on in the evening there was a call for extra bearers from Australia Gully, which a bearer subdivision of the 3rd Australian Light Horse Field Ambulance was ordered to reinforce. During the night wounded in large numbers were carried down to the pier at Waldren's point, where evacuations proceeded normally. The clearing of the wounded in the open and disputed trenches was at times almost impossible owing to machine gun fire and bombing. The scrub on Hill 60 was four feet high, serving alike to conceal friend in need and foe in arms; because of this, one of our chaplains, the Rev. W. Grant, C.F., attached to Wellington M.R., was killed while tending wounded of both sides. In all, these minor operations cost the New Zealand and Australian Division about 2000 casualties, the medical troops having two officers killed and four wounded.

The capture of Hill 60 concluded the offensive operations at Gallipoli; the remaining period was one of defensive operations, and ultimately, preparation for evacuation.

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CHAPTER VI.

The Evacuation of Gallipoli.

During the beautiful autumn months of September and October, although old Anzac and its shell-haunted beach still retained its grim character, in the main, "greater" Anzac was a spent volcano. The Dardanelles Campaign had become of secondary importance in the opinion of those in authority in England; all efforts were at present bent in preparing for the big Loos offensive due to commence on the 25th September. No great addition to the Gallipoli Force could be made until after that offensive had taken place, it was possible only to send small reinforcements so as to enable Sir Ian Hamilton to maintain his positions, his army acting as a containing force for the Turkish Army so protecting Egypt or Townshend's Force in Mesopotamia, now nearing Kut, from further aggression.

The first move in the new programme was the relief of the Anzac troops who were, by now, non-efficient as a fighting force mainly through sickness and exhaustion. The Second Australian Division came in to relieve; the 54th East Anglian Territorials, took over our positions north of the Aghyl Dere; the 13th Division —what was left of it—rejoined the 9th Corps at Suvla. These moves were not completed until the 10th of September by which time the remnants of the New Zealand and Australian Division were resting in Lemnos. The rest was most urgently needed. The strength of the two Infantry Brigades, nominally 4000 each, had fallen, in the case of the New Zealand Brigade to 1050 on the 12th September, while the 4th Australian Brigade numbered only 575. General Russell, whose mounted rifle command of four regiments had totalled 2000, could now muster only 200 officers and men. The New Zealand Field Ambulance had dwindled to 5 officers, 82 O.R., and they had received 4 officers, 50 O.R. reinforcements since landing. Most of the R.M.O.'s attached to the Brigades were casualties by wounds or sickness.

That this wastage was not wholly due to fighting is evidenced by the fact that the New Zealand Field Ambulance admitted 1693 sick and 1435 wounded during the month of August. The sickness wastage had been extraordinary: at the end of August

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nearly 100 per thousand per week. The strength of the Australian and New Zealand Corps in the first week of September was 25,175 officers and men, of whom 98 officers,, 2194 O.R. were evacuated sick during the week; a wastage at the rate of over 90 per 1000 per week. The average losses by sickness at this time in one of the Armies in France averaged rather less than five per 1000 per week. The hurried movements of troops, the congestion in the Dere with it's attendant fouling of the ground and the lack of a sustained sanitary effort—almost impossible to maintain during periods of severe fighting—all lead to a dissemination of diseases already over-prevalent; while the exhaustion and physical deterioration of the men rendered them much more susceptible to infection. The following extracts from R.M.O.'s reports of the period are expressive. The R.M.O. of a New Zealand Battalion writes:—"There is much enteritis amongst the men of this battalion, many of them come to me in a collapsed condition from strain and overwork. The men are very willing, but they are quite unfit for more work just now." Here is another extract from the report of an R.M.O. of an Australian Light Horse Regiment: "With reference to the health of the troops of this regiment, I have to report that during the last few weeks there has been a high proportion of sickness accompanied by rises of temperature. Some of these may be influenza, but some are suggestive of early typhoid of which the numbers are increasing. So far I have had no notification of this disease amongst the men except by rumours from the base retailed by men returned from Mudros. The M.O. should be advised of any such cases, for in the present low state of health of the troops and the conditions of life in the bivouacs, the appearance of typhoid in epidemic form is to be feared, and stringent measures would be necessary to check this disaster." The epidemic had already broken out: a notification was sent to this R.M.O. of two cases of "enteric" in his regiment on 22nd August, 1915, a few days after his report went in. Daily notification of large numbers of "enteric" cases were reaching the A.D.M.S. from the base; the disease was disseminated throughout all units of the division. Early notification of bacteriologically diagnosed infectious disease was not possible at Anzac as we knew it in France: many of the cases were not definitely diagnosed until some time after they had reached remote hospitals in Egypt or Malta. A Bacteriologist with a mobile laboratory was in contemplation, but the suggestion of establishing such a laboratory on Anzac was for a variety of reasons never carried into effect.

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Obvious signs of war weariness were also noted by observant medical officers. One R.M.O. notes in his diary after a tour of inspection of his trenches: "The men have lost their old keenness for sniping and observing. They lie about the trenches taking little of their old interest in the business of fighting." Not only the medical officers but the combatant officers were keenly alive to this paralysing wastage. The following report from Brigadier General Monash is a lucid commentary on the position. He addresses the New Zealand and Australian Divisional Headquarters from Australia Valley on 17th August, 1915:—"I am becoming seriously alarmed at the persistently adverse reports made to me by the Regimental officers of the brigade as to the physical condition and health of the troops. Evacuations for sickness which could not be treated in the lines amounted to 150 in the last four days, and are daily on the increase, the principal complaints being tonsilitis, bronchitis and dysentery. There are also many sick men, not evacuated, who are set aside for light duty but are really not to be counted upon in an emergency. The medical officers also state that the physical fitness and powers of endurance of the personnel not actually reporting sick are much below normal. I should be glad if the A.D.M.S. could be asked to make a thorough investigation into the health conditions of the brigade with a view to advising what steps are possible to restore its fighting efficiency." A very striking report from one of the medical officers of this brigade is worthy of perusal. "The sick parade this morning numbered 42, of these 31 are not in a state to be depended upon as fighting men in any emergency, they are mostly incapable of any form of exertion. In the trenches I notice that many of those who used to be the keenest of our old hands now seldom shoot or observe; they have reached the stage of absolute indifference." This R.M.O. goes on to describe the condition of one young soldier in his battalion, now recognisable as a typical picture of War Neurosis, a term as yet unknown at Anzac. "Private . . . aged 18 undersized, was in one attack on the afternoon of the 26th [Hill 60]. He went forward with his platoon commander and 10 men. They took cover under a hedge" [probably the boy's statement] "the officer told them to fire a few rounds but private. . . could not discharge his rifle, nor even put it to his shoulder; he was told by his officer to crawl back, which he did. On the evening of the 28th his pulse was 120, his temperature 100 degrees. He could not walk in a straight line, he had violent trembling of the whole body with twitching. He was holding both hands tightly clenched together and on making

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him loosen them they both shook violently. He cannot sleep, every shot makes him jump or twitch; he says he can never face fire again. This boy may be called a coward, but it is to be noted that he advanced under heavy machine gun fire and did not retire until ordered. I believe his nervous system, like his body, weak in the first place, has been permanently shattered."

Every effort was being made in August to check wastage by the establishment of "rest stations" in the ambulances. In the loose terminology of the time these rest stations were described as hospitals, whereas they were of course anything but hospitals. At the very best they offered only a few bell tents, the sick man brought his own blanket, great coat and ground sheet; an extra blanket was found by the ambulance. In some instances a stretcher was provided but the majority lay on the ground previously levelled to make a platform. Sir Ian Hamilton in his Gallipoli diary gives a pen picture of a C.C.S. at Helles, in July. "Walked through the different wards talking to some twenty officers and 200 men; mostly medical cases. Do not think things at all up to the mark. Made special note of the lack of mosquito nets, beds, jayamas and other comforts....Too bad, when so much money is being spent, to see men lying on the ground in their thick cord breeches in this sweltering heat, a prey to flies and mosquitoes." Conditions were similar at Anzac in the ambulance rest stations but the medical unit were compelled by the instance of the military situation to retain every man possible on the Peninsula because once evacuated from the beach the soldier was lost to his unit indefinitely. It was necessary to return to duty men who were obviously not fit, in order to conserve the rapidly dwindling strength of Anzac. In their efforts the medical officers were often aided and abetted by the spirit of the men who, although not really able to carry on much longer, hoped to "stick it out" for the sake of their comrades, as every evacuation meant extra work for somebody: this, more especially in the case of officers.

There seems to have been some real difficulty in obtaining sufficient drugs and comforts towards the end of the month. Lieut. Sandham, Quartermaster of the New Zealand Field Ambulance reports to the A.D.M.S at the close of August as follows:— "I beg to point out that I have requisitioned every day for the last three weeks for arrowroot, cornflour, meat extract and brandy. The brandy I have been able to obtain only in very small quantities while the cornflour and arrowroot I have been unable to get until to-day, when I received six pounds of each. Meat

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extract is unobtainable. I have not been able to supply the regimental officers with these comforts." The A.D.M.S., Colonel Beeston, A.M.C., sent a message to Anzac Headquarters on the 31st of August, of which the following is an extract:—"Medical comforts are not forthcoming and, we are informed, will not be available for 14 days. Can anything be done to expedite supplies, as without them there will be a great diminution of strength?" A previous message reads:—"Medical officers cannot obtain a supply of simple drugs such as castor oil, salts, bismuth, from the advanced supply depot of medical stores, in consequence many cases of sickness, especially dysentery cannot be treated here." As against these complaints we must set in the balance certain considerations:—(1) The extraordinary amount of sickness prevailing, far exceeding anticipated requirements of drugs and comforts. (2) The fact that R.M.O.'s were drawing medical comforts in large quantities for the use of the battalion sick. And this somewhat against the better judgment of the A.D.M.S., who frequently recommended moderation in these demands, and ultimately directed that all such supplies should be drawn from the field ambulances and not from the advanced supply depot, with the counter signature of the A.D.M.S.; as heretofore. (3) Transport difficulties which were undoubtedly great: even ammunition, so essential to the operations, was not obtainable in sufficient quantities. Of the bombardment on Hill 60 on the 27th Sir Ian Hamilton says:—"It was the heaviest we could afford." In the ambulances, at least, there was no real shortage, as a statement of receipts and issues of the N.Z.M.B.F.A. for the last fortnight of August shows. The total amount of comforts issued to the unit for the period was as follows:—Arrowroot 8 lbs.; brandy 3 pints; cornflour 13 lbs.; cocoa 4 lbs.; candles 4½ lbs.; milk 238 tins; meat extract 7½ lbs.; rice 14 lbs.; sugar 115 lbs.; eggs 18 doz. Assuming that the 40 sick they were nursing were able to utilise some portion of the ordinary ration drawn for each sick man retained in the ambulance, the allowance for light diets seems generous enough. As regards the shortage of drugs, this was only temporary although it had nothing to do with the alleged orders of General Birdwood issued against excessive indulgence: "lest castor oil on Gallipoli should become the Australian national drink." All necessary drugs, including emetine, were procurable at the end of the month. The question of the drug shortage is referred to in the final report of the Dardanelles which states:—"There does not seem to be any complaint as to the supply of medicine except in the case of

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Australian and New Zealand troops, who were said to be short of the ordinary medicines, especially castor oil, and of the variety of food required for men suffering from illness. There is no dispute as to the fact that, at one time, the supply of castor oil ran short, the explanation put forward being that the supply was sufficient to meet ordinary demands, but that for some reason these troops required and consumed more drugs than the normal supply. This is probably correct, for there are no complaints of a lack of things in any other quarter."

That the rest stations did some good there can be no doubt. The New Zealand Field Ambulance, after arrival in the Chailak Dere, admitted to its rest station 94 patients of which 23 were discharged to duty and 28 evacuated, leaving 43 remaining under treatment at the end of the month. Yet the temporary relief which the debilitated soldier had obtained was quite inadequate to his needs.

The causes leading to the abnormal sickness wastage, which had material effects in determining the failure of the expedition and which was a characteristic of the whole campaign, in which more men were lost through sickness than were evacuated for wounds, may be considered from a variety of angles. The climate, almost sub-tropical during the summer, was an important factor. One of the first of the predisposing causes to be considered is the clothing of New Zealand and Australian troops. Nothing indeed could have been more primitive than their garb: a battered slouch hat, the red band of the pugaree, where it survived, faded to a pale apricot colour, a pair of shorts, daily growing shorter, worn inside out as a necessary precaution against lice infestation of the seams, putties and boots, an identity disc and a first field dressing completed their get up. The skin in most cases tanned a coppery brown from excessive exposure to the sun, the knees very often bandaged to cover up abrasions which became ulcers that refused to heal. Excessive insolation of the skin is, in all probability, injurious to white troops in the field, however beneficial it may be when used therapeutically in the treatment of localised tuberculosis in the high lands of Switzerland. In warfare the "shorts" and the kilts, however attractive, have this great disadvantage that they leave a large area about the thighs and knees exposed to all sorts of minor injuries with consequent infections which are disabling. It is said that a French General in command of British troops in the near east forbade the use of shorts not for hygenic reasons but because he considered them indelicate! Here, then, in the scanty clothing of the New Zealand

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troops, was a predisposing cause to the prevailing sickness. Campaigning in such a climate for troops not seasoned to the tropical summer was prejudicial to their health. Not only was the clothing inadequate but the food and the feeding of the troops was unsatisfactory. There was much discussion then and afterwards on the subject of rations: that the issue was not suited to the climate; that there was too much meat and too little bread; that the sample of bully beef issued—Fray Bentos—was too salt and too stringy; that there was an insufficient supply of fresh vegetables and fruit; that canteen stores could not be purchased. On all these matters much evidence was given by officers of the division before the Dardanelles Commission—General Godley; Lieut.-Col. Begg, N.Z.M.C.; Lieut.-Col. B. Myers, N.Z.M.C.; Lieut.-Col. P. C. Fenwick, N.Z.M.C; and others. It was shown that many of the men attributed the diarrhoea to eating bully beef of the brand named. In the final report of the Dardanelles Commission the opinion is expressed that—"...there was nothing actively injurious to health in the meat; but it was of poor quality, and, from being salt and stringy, it caused some intestinal irritation and so conduced to diarrhoea....It must be remembered that the Australian and New Zealand troops had been at Anzac when the hot weather began, continually in the trenches, and without proper opportunities for rest, and that their energy and activity had been overtaxed. They were, therefore, very liable to ill-effects from food unsuitable to such weather." All shipments of preserved meat on issue to troops were subjected to close inspection and analysis by the Public Health Authorities in London, and it must be said in favour of the Fray Bentos brand that it was a favourite in France in '14 but, however palatable in a temperate climate, any form of tinned food becomes distasteful in a semi-tropical summer unless ice is available. A passage in Owen Rutter's *Tiadatha* descriptive of the Balkan summer is vividly reminiscent:—

"All day they lay and simmered,
Stuck a blanket up for shelter,
Spent the sultry morning thinking
Of the things they would have given
For a long sweet draught of cold beer,
Bass or Worthington or Allsopp,
In a long cool lager beer mug.
Sighed and drank some tepid water
Ate some squishy-squashy bully
Moist and warm and very nasty."

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It is questionable whether any alterations in the dietary—and some were made—could have improved the sanitary situation. The baneful system of individual cooking, then prevalent, would have ruined any ration however good; every man cooked for himself, every dug-out became a midden of fly contaminated food and food refuse. When the soldier should have been resting he was engaged in predatory expeditions in search of water and fuel for his kitchen, and when the final product of his cuisine was consummated, it, no doubt, was highly indigestible, however appetising. The individual kitchen was wasteful of energy and rations; its products too often a breeding or feeding place for flies. The large open latrine was a stone's throw away on the crowded hill side, and from kitchen to latrine there was much coming and going all day by the swarming hosts of winged enemies.

Of flies there was more than enough, and of many kinds. *Lucilia Caesar,* the green bottle fly was most numerous in the vicinity of the trenches; it bred in the dead bodies lying in No Man's Land. One of the favourite sights of the Apex, reserved as a rule for "new chums" was a periscopic vision of the body of a Turk lying not too far from the parapet completely wrapped in a write shroud of living maggots, larvae of *Lucilia Caesar.* It came to be known in 1916, by Wenyon's experiments reported by Stitt and Balfour, that *Lucilia* and the *Caliphoroe* green and blue bottle flies, were carriers of amoebic dysentery, and that after feeding on human dejecta, which were known to contain cysts of *Entamoeba Histolytica,* the excreta of the flies were found to be teeming with such cysts. Can it be doubted but these flies were actively disseminating one form of dysentery, the amoebic type. Further, the house fly was noted to be breeding quite freely in human dejecta: it was found by experiments carried out by the Indian Ambulance attached to Cox's Brigade that in the shallow trench latrines flies bred to perfection, the earth covering the small trench (3 x 2 x 2) being carpeted with larvae at the end of a week after filling in; even spraying the contents, before covering, with 10 per cent. Cresol solution did not seem to be a deterrent. Typhoid fever and the paratyphoid fevers with the various types of dysentery certainly could be propagated by flies bred under these conditions. Other fly breeding places were the mule lines and the manure heaps at the foot of the Chailak Dere. Incineration of the mule manure was well done by the Indians S. & T., after the methods practised in India—drying and burning in specially constructed heaps—at least during the dry weather. When rains came it was no longer possible to incinerate. There was much manure, much refuse

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everywhere in unexpected places, the wreckage of the August battles and the hurried movements of troops by night. So far the requirements of defence, the exhausting labours involved in the digging of deep trenches and communications had left no time or energy to the tired troops to clean house or to organise conservancy. A new and very large area had to be assimilated, the frontiers defined or delimited by the bayonet, the defences secured before the necessary work of dealing with the sanitary problem could be taken in hand. Improper clothing, inadequate feeding, much exhausting work, little sleep, were the predisposing causes to sickness; the determining causes, fly-borne infection, over crowding, direct contact, and dissemination by carriers. Amoebic dysentery was known to be endemic in the civil population of the Gallipoli Peninsula prior to the war, due to water-borne infection; certainly, malaria and phlebotomus fever or sandfly fever, were common in certain villages; and malaria existed amongst the troops at Helles but was not recognised, if it existed at all, at Anzac. Sandfly fever, however, was fairly prevalent in the autumn. Typhus fever, although not uncommon among the Turks, happily did not afflict Anzac and, as this disease was later proved to be lice-borne, it was a providential immunity to a population almost universally lice infested.

Now that there was breathing time and fresh troops to man it, Anzac was to be put through an intensive course of supervision and sanitation. The dietary was the first consideration as the following documents show. The first is a letter from General Godley addressed on 10/9/15 to ANZAC Headquarters in which he says:—"In connection with the health and general want of spirit of the troops of this Division I am convinced that the monotony of the diet is a factor largely responsible. The brands of preserved meat issued, particularly "Fray Bentas," quickly become unpalatable and the men prefer to do without meat rather than eat it. The meat is coarse in fibre, non-nutritious and too salt; in comparison with that obtainable from Australia and New Zealand, it has no place. I recommend that preserved meat of varied kinds, beef, roast and corned, roast mutton, sausages and tongues, etc., be obtained from the leading firms of the Commonwealth and Dominion. I also strongly recommend the establishment of a canteen where the men could purchase food of a variety suitable to their particular taste. Any expense incurred would be more than recouped in the improved health and morale of the men." To this letter Corps replied:—"All the points raised by you in your memorandum of the 10th instant have been and are under

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anxious consideration of the Army Corps Commander. A special Commission visited Anzac recently and has submitted a very exhaustive report dealing with the subject of diet, and I understand that General Headquarters is taking action to carry out the proposals submitted to them as far as possible." This memorandum is signed by Colonel N. O. Knox, A.S.C., A.Q.M.G. of the Corps, who had previously been on General Godley's Staff in New Zealand and had organised the N.Z.A.S.C. The Special Commission referred to had been sent out from England to investigate and to revise the dietary. The question of canteen ships is an important one. It is a known proposition in dietetics that a ration however good, ceases to have full nutritive value if it is adhered to so closely as to become monotonous or distasteful. Appetite is so much a question of psychology, where daily food is available, and digestion and assimilation so dependent upon appetite that food, if it is to maintain normal nutrition, must be varied at least occasionally. Condiments are an essential ingredient in a well balanced dietary, not in themselves in any way nutritive, but acting as stimulators of gastric and pancreatic secretion and in some way, as yet not determined, as activators of the processes of metabolism. It would appear that no application for canteen ships was made before the end of May and that when the first ship—financed out of the old South African War Canteen Funds—arrived about August and some sort of a canteen was established at Imbros, supplies were so limited that the Anzac troops could obtain only very small quantities at a time. Condiments were of course much in demand, as they were not provided for in the rations; a singular omission, as the Japanese in their war in Manchuria were careful to supply—no doubt on the advice of hygienists—the sauces, pickles and condiments now agreed to as essentials to a balanced dietary. Condiments were never asked for by G.H.Q. It was the opinion of the Dardanelles Commissioners that had canteens been made available earlier there would have been a reduction in the sickness.

A very active sanitary commission organised in England in July had been sent out to the near East to advise General Baptie, V.C., P.D.M.S. on matters concerning the health of troops in Egypt and the Dardanelles. The Commissioners: Colonel W. Hunter, A.M.S.; Colonel Balfour, R.A.M.C.; Lieut-Col. G. S. Buchannan, R.A.M.C., of the London Board of Health; and Lieut.-Col. L. S. Dudgeon, R.A.M.C., Pathologist to St. Thomas' Hospital, in one of their earliest reports, (Cairo, August 10th) wrote as follows:—"We were struck by the severe type of enteric fever

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found amongst the cases that have been inoculated in New Zealand. We have been informed that these inoculations had been made with a vaccine prepared from a culture obtained from a bone abscess of some fourteen years duration, i.e., an enfeebled strain of organism, and had given rise to little or no reaction. We therefore recommended that it would be a wise precaution to reinoculate the New Zealand troops with a stronger vaccine such as that issued by the Home Army." Because of this the reinoculation with Army T.V. of the New Zealand troops at Mudros was started at the end of the month of September. Of the controversy that ensued as to the validity of the New Zealand T.V. inoculation we shall speak later, suffice it to say that the preventive measure was considered necessary by competent authorities at the time.

Towards the end of September the first sanitary section was formed by the New Zealand and Australian Division. The earliest sanitary sections appeared in France about April, 1915, they were the First and Second London Sanitary Sections, Territorial formations, sent out originally to fill the place of the Sanitary Sections on the L. of C. whose duties are defined in F.S. Regs. part I. Chapter 9 Sec. 85. Besides their duties on the L.O.C. these units were doing a lot of necessary work in looking after areas just behind the line that had no settled sanitary control. Sanitary sections were not part of the original establishment of the Regular Army but became a part of a Divisional Composition in August, 1915. The New Zealand and Australian Sanitary Section was organised to supervise the cleansing of the unallotted areas, the miles of roadways, beaches and communications that had no definite military sanitary control; cleanliness of the public thoroughfares was the first consideration and the erection of public conveniences. The men of the sanitary section, 21 in number, were not, at first, drawn from medical personnel, there was none to spare; they came from the Australian Light Horse and the Infantry, and were quite untrained, so that a course of instruction had to be arranged.

At Mudros, where the New Zealanders were in rest camp at Sarpi, there was a serious shortage of N.Z.M.C.: so many had been evacuated sick at the latter end of August the two New Zealand Ambulances could muster only 7 officers and 74 men. Inoculations with the R.A.M.C. vaccine, T.V., were proceeding; the site selected for injection was a few inches above the olecranon process of the left arm which was found to be preferable to the abdominal wall site previously used in New Zealand. A small

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isolation hospital was established for scarlet fever and diphtheria, prevalent amongst the reinforcements. Early in October a medical inspection of men of the Mounted Brigade and their newly joined reinforcements showed that of the Anzac survivors 30 per cent. were B2 and that out of the Reinforcements:—21 were classed B2, 6 classed "C" by reason of minor disabilities, such as flat foot, old injury to knee joints and cardiac disorders. There was a severe outbreak of diarrhoea amongst the 6th Reinforcements shortly after arrival at Mudros, attributed to drinking bad water, undue consumption of unwashed fruit, fly-borne infection of food. Many of these cases presented dysenteric symptoms, the passage of blood and mucus, so that they were treated with emetine, grs. 2/3, followed by one grain hypodermically every other day with good results, in some cases. A certain number had to be evacuated to hospital. The use of emetine hydrochloride in amœbic dysenteries had been ordered by D.M.S.'s instruction dated 22nd August, 1915; at first there was no supply available at Anzac but early in September the drug was in use. At this time the army knowledge and practice in the recognition and treatment of the dysenteries was in a process of evolution. It was certainly believed to have been proved, at this time, that 60 per cent. of the dysenteric diarrhoeas of the Peninsular were amœbic in origin(O'Connor), so that in 1915 the drug, emetine, was extensively used in the treatment of the disorder with variable results; some deaths were recorded and attributed to the drug on evidence that is not absolutely convincing. At a meeting held at Alexandria on October, 17th, 1915, Lieut.-Col. Sir Ronald Ross, I.M.S., recommended the combined use of emetine and powdered ipecacuanha by the mouth and reported that 14 per cent. of the cases of chronic dysentery in British troops in India developed hepatic abscess. Major C. J. Martin, A.M.C., Pathologist to No. 3 Australian General Hospital at Mudros West, summed up the matter in a contemporary report:— He says: "From the latter part of August, 1915, to the end of September the prevailing type of dysentery in this hospital and among patients from neighbouring hospitals whose stools were sent to the laboratory for examination was amœbic. Early in October, however, it became evident, from the examination of stools, that bacillary dysentery was becoming more common than amœbic: and cases of the former disease began to find their way to the postmortem room. The variety of dysentery bacilli isolated from stools, and from the cadavers has been with one exception Shiga bacillus."*

*See Appendix: Dysentery at Anzac.

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Up to the end of September affairs at Anzac remained quiescent. About the 23rd Colonel Beeston, A.M.C., the A.D.M.S., was evacuated with symptoms suggestive of hepatic abscess. In Anzac, since the landing, he had commanded the 4th Australian Field Ambulance with distinction until he replaced Lieut.-Col. Begg, N.Z.M.C., as A.D.M.S. of the Division in August. He was succeeded by Lieut.-Col. Tate Sutherland, A.M.C. O.C. 3rd Australian Light Horse Field Ambulance; Captain Dawson, A.M.C. was acting D.A.D.M.S. at this time—the 5th Officer to hold the appointment since the landing. About the end of the month a new kind of bomb introduced by the Turk and emitting evil smelling fumes suggested the possibitily of his using gas; unusual sounds were heard in his trenches which were interpreted as having some relationship to an impending gas attack. Fresh instructions were issued with regard to gas precautions and instructors were brought over to lecture the troops. The respirators in use at the time consisted of a veil with a cotton waste pad impregnated with anti-gas chemical. There was also a limited issue of "P" helmets made of flannel and fitted with non-inflammable cellulose windows. Both were stated to give complete protection against chlorine. Knapsack sprayers with sodium thiosulphate and washing-soda solution were provided for use in the trenches. A languid interest was taken in this instruction, but gas precautions were never effectually organised at Anzac. The wind was mostly westerly, Turkwards.

Towards the end of October some early indications of the onset of winter, occasional gales with colder nights, stimulated the preparations for the wintering of the troops. Rain fell on the 22nd, and the temperature dropped, but the weather otherwise was fine and warm.

The fall of Serbia and the retreat of the Russians from the Brest-Litovsk line were unfavourable to Anzac. Lord Kitchener's message was to dig in as there was no present intention of evacuating, but it was apparent that the Turks were receiving better ammunition than heretofore, as by the defeat of the Serbian Army the railway was now opened from Nish to Constantinople. Sir Ian Hamilton had been recalled to England; the D.M.S. Surgeon General Birrell bade his farewell in September; General Godley was temporarily commanding the Corps; General Birdwood commanded the M.E.F. until relieved by General Munro, who visited Anzac on the 30th. The gales of October washing away our piers and wrecking the lighters, so as to render communications with the shore or the landing of troops impossible for

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a time, made it clear that our tenure of the Anzac and Suvla positions was imminently precarious and might end in disaster. Already the Government were calculating the cost of evacuation, General Munro strongly recommended it as he held that the position had every military defect, but Lord Kitchener still favoured digging in and hanging on, as the operations were holding up some 200,000 Turks. The centre of interest had shifted to Mesopotamia and Salonica.

Affairs at the Base in Egypt at this time may be considered briefly. We have seen that No. 1 New Zealand Stationary Hospital was established at Port Said. It was at first used as a convalescent hospital and had 500 beds in August. The No. 2 New Zealand Stationary Hospital commanded by Lieut.-Col. Parkes, N.Z.M.C., had been constituted the New Zealand General Hospital by recommendation of the D.M.S. in Egypt, Surgeon General Ford: and, by an agreement between the New Zealand and Egyptian Governments, we took over the Pont de Koubbeh Hospital of the Egyptian Army with 612 beds opened in August. Major W. Byam R.A.M.C., remained on as registrar, his pay at Egyptian rates being found by the Dominion Government. No rent was charged for the building.

A concentration camp for unfit men of the N.Z.E.F. had been formed at Suez. The necessity for this camp arose early in August. Men unfit for further military service were being boarded in hospitals and posted to various convalescent camps, but there was great difficulty in keeping in touch with these men: many were lost sight of for a time, to reappear only when a transport was due to leave for New Zealand. They now clamoured for return, but by this time no trace of their board papers could be found although they claimed to be permanently unfit. On the other hand many cases were boarded for return to New Zealand but could not be found when the transport was sailing. A concentration depot near the port of departure was required. Ultimately a camp for 600 unfit and invalid men was authorised by instructions received from the New Zealand Government and by 21st August, 1915, was established with Captain Tapper, N.Z.M.C., in medical charge. Invalids were still returning to New Zealand in large numbers: the *Tahiti* took 500 in August, the medical personnel consisting of 2 N.Z.M.C. officers, 12 O.R., 4 nurses; the *Aparima*, carried 100 venereal cases under 1 M.O. and 5 O.R., N.Z.M.C. But owing to representation made by our Defence Minister, that 25 per cent. of these venereal cases returned fit to New Zealand, and further the G.O.C. N.Z.E.F., Gen. Godley,

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directing that convalescent venereal cases should be sent on as reinforcements, no further evacuations to New Zealand by venereal infection were permitted. The A.D.M.S. in Egypt was recommended to enforce prophylatic and preventive measures.

The New Zealand Hospital Ship *Maheno,* Col. Collins, N.Z.M.C. in command, called at Anzac on 21st August and left for England on September 13th. She was inspected by Col. Howse, V.C., under instructions from Gen. Birdwood and the opinion formed on the ship is of interest to quote, as it comes from an impartial source. Col. Howse says in his report dated 30/8/15:—"I inspected the New Zealand Hospital Ship *Maheno* on August 27th. She has accommodation for 350 cot cases and 100 cases on deck. The staff, all specially selected, consist of N.Z.M.C. officers, 7; nurses, 14; other ranks, 61. She is well equipped with all the most modern fittings, having two operating rooms, X-ray room, laundry, isolation and observation wards. Many small comforts are provided for patients which one would only expect in a first class hospital ashore; for instance, there is a small library in each ward. The public of New Zealand subscribed £40,000 for the purpose of providing complete equipments and fittings adapted by New Zealand labour." Col. Howse finds some objectionable features: double deck cots which make surgical treatment and nursing exceedingly difficult; lack of single or double rooms for the use of very senior officers; that the quarters provided for N.C.O.'s and the men of the N.Z.M.C. were inadequate.

Early in October No. 1 New Zealand Stationary Hospital was warned for departure overseas. General Godley had already applied to have the unit sent to Lemnos, but to his request there was no reply. Colonel Heaton Rhodes, the New Zealand Red Cross Commissioner, had also asked that the hospital might be sent to Mudros; he was informed that its destination was unknown. Ultimately it embarked at Alexandria on 19th October on the s.s. *Marquette,* with 8 officers, 28 N.Z.A.N.S. nurses, 9 N.C.O.'s., 77 O.R., total 122, in company with the 29th D.A.C., comprising 500 officers and men, 500 mules, and a quantity of ammunition. The *Marquette* was torpedoed on the 23rd when 60 miles from Salonika. She sank in 7 minutes with a loss of 18 N.Z.M.C., N.C.O.'s and O.R. and 10 N.Z.A.N.S. nurses drowned. The survivors were picked up after variable periods of immersion up to 10 hours, and carried to Salonika or to Egypt. The equipment, of course, was a total loss.

By the end of October the New Zealand General Hospital had admitted all the New Zealand sick and wounded then in Egypt

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and had a bed state of over 700. By this time a total of 28,000 men had sailed from New Zealand in which total 95 officers and 1029 other ranks, N.Z.M.C., and 187 N.Z.A.N.S. were included. The casualties up to the 27th August, 1915 had been:—Killed, 1017; died of wounds, 451; missing, 638; wounded, 4327; P.O.W., 20; died of disease, 162. Total casualties:—5977; killed or died, 1630. The number returned to New Zealand up to 31st October, 1915, was 2000. The number of sick and wounded in hospitals in Egypt, Malta and England or elsewhere was 2,357. There were 10,000 men in the training camps in New Zealand where a new field ambulance, the 2nd, was in course of mobilisation.

By the 10th November, the bulk of the New Zealand troops and the 4th Australian Brigade had returned to the Division at Anzac looking much improved by their rest. The New Zealand Field Ambulance under Lieut.-Col. E. O'Neil, D.S.O., took up its old quarters above the Turkish bivouac in the Aghyl Dere; the N.Z.M.B.F.A. now commanded by Lieut.-Col. Murray, N.Z.M.C.—late Major in charge of Pope's Hill A.D.S.—established its M.D.S. near Chalk Hills but to the north of the old site occupied in August. Lieut.-Col. Begg, C.M.G., had returned to his appointment as A.D.M.S. relieving Lieut.-Col. Downes, A.M.C.—the 5th A.D.M.S. of the Division. One had been killed, one wounded, and 2 evacuated sick. Major Mathew Holmes, N.Z.M.C., was now acting D.A.D.M.S.

The return of the troops coincided with the visit of Lieut.-Col. the Hon. R. Heaton Rhodes, T.D., M.P., who had been sent out as a commissioner by the New Zealand Government to investigate conditions in the N.Z.E.F. in Egypt, Gallipoli, Mudros and Malta and to report to the Hon. the Minister of Defence at Wellington. After visiting the New Zealand Hospitals in Egypt and the New Zealand sick and wounded in Mudros and Malta, and after frequent consultation with the sanitary advisory committee, he came to Anzac and made a thorough investigation of conditions, sanitary and otherwise. He noted that the rationing had improved, that in addition to other rations fresh bread and fresh meat were issued three times a week besides rice and a small quantity of preserved milk. He found that there was a general demand for oatmeal as some of the combatant officers considered that this article of diet, when obtainable from warships, was very beneficial to the health of the men. He accordingly made arrangements for a supply of 20 tons to be shipped forthwith from New Zealand. The cheerfulness, patience and goodwill of this New Zealand Commissioner was very comforting and

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helpful to all who came in contact with him, especially the sick, the wounded and the N.Z.M.C. officers both in Egypt, Mudros and Gallipoli. His report to the Defence Minister in Wellington published in appendices to parliamentary papers, Vol. 2.—19B., 1916, is a valuable commentory on the general conditions of the N.Z.E.F. during the Gallipoli campaign and a memorial of painstaking and intelligent endeavour. Above all his presence at the front in the trenches at Anzac made all alike feel that the people of New Zealand were fervently thinking of their men-at-arms overseas and bending every effort to secure their welfare and comfort.

The visit of the Sanitary Commissioners came a little later. Lieut.-Col. Dudgeon, R.A.M.C. was the first to arrive. He inspected part of the lines of the New Zealand and Australian Division occupied by the Australian Light Horse. His advice was to push on with the flyproofing of latrines and to enforce the chlorination of all drinking water. He noted a marked prevalence of gingivitis or pyorrhoea incident to a great extent in the older residents, considered by some to be an evidence of scurvy which certainly existed amongst the Indian supply and transport drivers at Anzac. For this dental condition which the Sanitary Commissioners believed to be a predisposing cause in gastro-intestinal disorders adequate dental treatment of drafts was strongly recommended. The provision of company kitchens and the abolition of individual cooking was another matter commented upon. All these measures, however, had already been under consideration and were strongly recommended by the local sanitary officers. Lack of material was one of the chief difficulties in completing the necessary sanitary work already in hand. Most units, had already, by force of circumstance, adopted the company kitchen. The need for greater economy in food and fuel was urgent. By now most of the scrub and the few olive trees originally on Anzac had been cut down for fuel or constructional purposes, so that it was necessary to make an issue of one pound of fuel daily per man. In most instances the type of kitchen adopted was the raised trench pattern with puddled clay and stone walls and suitable openings for kettles—as figured in the 1911 Manual of Military Engineering, plate 7—with small ovens ingeniously contrived of oil drums, kerosene tins, and other heterogeneous metal containers. There was a chimney of biscuit tins, and in some kitchens a roof of galvanised iron—how obtained the C.R.E. had yet to learn—and a few sandbags for walls to close in the dug-out. In some instances a stock pot made from an oil

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drum gave excellent returns in the shape of hot oxo and pea soup when tablets of these invigorating products became an issue in the colder weather. The fat of the ration was made into dripping to be used in lieu of butter in the best establishments, and a fairly palatable porridge of crushed biscuit was provided. During the gales of early November the flies became even more unbearable as they sought the refuge of the warm kitchens and dugouts. But lack of material for essential works, even overhead cover in the trenches, that is, in sufficient quantity, was a serious obstacle to the completion of the necessary work of sanitation. There were not even sufficient camp kettles to allow of a full issue to each company.

The much-to-be-desired fly proof latrines had not yet been universally adopted. Model latrines were erected in the dere by the sanitary section, but owing to the shortage of fuel any wood used in their construction soon disappeared—the troops even cut down for fuel the scrub which concealed them from enemy observation. Here was a real difficulty: any sort of timber was more precious than gold or even life. All the ration boxes which might have been used for flyproofing were used as fuel, the normal use in the field. The simplest form of improved latrine consisted of an oil drum with a movable fly-proof lid, as first devised in France early in 1915 by the London Sanitary Companies. They had two faults: the lid was movable, hence removed nightly; the lids were not self-closing. In certain places deep fly-proof latrines were constructed: that is, very deep broad trenches covered by planks and provided with movable lidded seats so constructed as to be self-closing. Substantially made, these deep trenches acted well and were moderately flyproof. As used in Egypt at a later date they had a serious defect that flies were able to breed in them, the larvae subsequently emerging, it is said, through six feet of sand. The only solution seemed to be incineration of the contents of the bucket-type of latrine; this again needed fuel. Nevertheless the persevering R.M.O. urged by the Sanitary Officer obtained some wood, by means other than those provided for in the Regulations, and when he found his wooden fly-proof covers vanished in the night, remade them with biscuit tin lids covered with sacking. Truly, as Sir Ian Hamilton says:—"Anzac was ever resourceful in the face of adversity."

The conservancy of the trenches themselves presented peculiar difficulties. In the Apex area certain readjustments of the trench system were forced on us by the certainty of heavier bombardments in the near future. An alternative front line had to be dug

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close to the original, new saps and communications made, deep dugouts and shelters for the garrison provided. During the progress of these works, dead bodies were occasionally encountered, and sometimes a deep latrine wrongly sited or a filth trench had to be faced as the site must be included in the works. The ideal trench sanitation would preclude the possibilities of such unpleasant engineering difficulties. The presence of dead bodies is often impossible to obviate as the trench line develops automatically at the spot where the advance is held up with heavy casualties. Bodies become entombed in parados or parapet, or even in the trench itself if it happens to be deep and muddy as in the case of the ditches of Flanders in 1914, which in the struggle for Calais became at first a grave for the dead and later a shelter and a home for the living. Quick lime and cement were the only remedies for this kind of obstruction. It is otherwise with old pit latrines or filth trenches: in such ground the soil of the new work becomes contaminated by pathogenic organisms to a dangerous extent, disinfection is an impossibility and the certainty of infection of wounds suffered in such a locality is assured. The idealist in trench sanitation would ban all open latrines or filth trenches, between his front line and support lines; the area intervening should be ground undefiled by any such abomination.

Of trench life in the Turkish lines we were able to gather a little information from a Turkish soldier who deserted to us about this time. Their food was very simple: in the morning at about 8 a.m. they had porridge made from barley grains; at midday there was cheese or on alternate days olives were issued as a relish to their barley bread; and in the evening white beans cooked with fat, or sometimes onions with a little meat: the daily ration of bread was 2 lbs. The porridge and the beans were stated to be unsatisfactory, but it kept them alive, and when the cold weather set in they had a ration of raisins in lieu of cheese. The deserter had seen coffee only once; tea was not used as they had no sugar, and unsweetened the beverage was not acceptable to the Turks. The orders were very strict about keeping trenches clean so as to ward off sickness: not even cigarette ends were permitted to remain, the trenches were swept out twice daily. Behind each trench was a small open latrine in which lime was used daily. There was only one doctor per battalion; slight cases were not sent to the field hospital but were looked after by the doctor; only very severe cases were sent to Constantinople. Iodine was reported to be very short—otherwise the doctor appeared to have plenty of medicines.

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The chlorination of drinking water recommended by the sanitary commissioners, was now strictly enforced, but owing to lack of experience there were some well founded complaints of evil tasting water. Certain initial difficulties had to be overcome, the chief being the provision of bleaching powder—a product which had not previously been used in the New Zealand and Australian Division. There was some confusion as to what was required, as chloride of lime had been an issue for water purification, but eventually a fair supply of the new preparation was discovered at the A.S.C. Depot. Again, there were no water carts of the new pattern—Ruston mark 4—which were not on issue to our division nor to any Australian troops at this time. Neither water duty men nor medical officers had any definite knowledge of the new method of chlorination. This was hardly possible as the process was a confidential matter even in France, and no official document dealing with the use of the cart had been issued. The old procedure of chlorination by chloride of lime and dechlorination by thio-sulphate was the only one taught to the troops who landed. Canvas troughs were originally provided for the purpose, but had ceased to exist except as issues on charge to battalions. The water duty men, perfunctorily trained in the first instance, and having no duties to perform, so they said, were rapidly absorbed into the R.M.O.'s medical establishment and became medical orderlies, dressers, or sanitary men. It became necessary, if chlorination were to be enforced, that these water duty details should be instructed in and encouraged to carry out the functions for which they were detailed. A new pattern water cart was kindly lent by a field ambulance of the 54th Division, a class was initiated and demonstrations in clarification and chlorination held. There was some show of ill will towards the new order of things, as the nursing of sick and attentions to the wounded seemed more honourable than water duties; however, all difficulties were eventually overcome and each brigade chlorinated daily in the 300 gallon tanks provided. The only danger in the provision of a pure water supply to the trenches —chance pollution in transit—was now eliminated. The water from the new wells opened up at No. 3 outpost was in all probability of very fine quality; there were no habitations in the vicinity to contaminate it, and it was otherwise well protected. But the handling at the large tanks where the water was piped into the Fantassahs for mule transport, offered some chance of pollution. Dust might have been introduced either at the principal reservoirs or at the smaller brigade tanks close to the line. All these dangers

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now were countered and the water supply guaranteed in quality as well as quantity. The water at Anzac itself was brought from Mudros where chlorination in bulk took place. It was pumped into reservoirs on Plugge's Plateau and reticulated to various subsidiary tanks. The water question was a serious one at South Anzac: the daily consumption about 29,000 gallons and only four days' supply could be stored.

The last of the sanitary recommendations was:—The provision of dental prophylaxis. This had already been provided for by the A.D.M.S. who opened a "dental hospital" at No. 2 outpost, with four N.Z.M.C. dental officers, four mechanics, and essential equipment including the necessary apparatus for prosthetic work; and this apart from the dental work done by N.Z.M.C. dental officers attached to the Field Ambulances. New Zealand had certainly led the way in the provision of an adequate dental service for an Expeditionary Force and a dental hospital capable of carrying out any form of repair or mechanical work and the making of dentures and provided with cylinders of nitrous oxide gas and dental engines perched on a trenched hill side, cheek by jowl with a very noisy mountain battery, surely reaches the "limit" in front line dentistry.

But in spite of all this sanitary effort the last days of Anzac were again to see an orgy of sickness. In the cold snaps that came in October epidemic jaundice broke out amongst the garrison, the veterans mostly affected. The epidemic developed a very severe form in the middle of November, one case of icterus gravis, dying at the C.C.S. on the 13th. Epidemic jaundice of armies had been met with in most wars since Baron Larrey first described a jaundice associated with haemorrhages observed by him at Cairo during Napoleon's campaign in Egypt. The fatal case alluded to above was of this type, indeed, from the petechial haemorrhages, it was at first mistaken for a case of C.S.M., but a post-mortem examination showed that it was haemorrhagic icterus. Weil of Heidelberg gave his name to the disease in 1886 by describing an epidemic jaundice in Germany. During the South African War, over 5000 cases were reported with a low death rate. The spirochoetal form of haemorrhagic jaundice with a high mortality rate was first reported by Tuada and Ito in Japan in the first year of the great war and several French investigators on the Western Front had already confirmed their findings in 1915. The outbreak we were observing was common to Helles, Anzac and Suvla, with a variable incidence of 2 per cent. to 10 per cent. in units. The speakers at a meeting of the

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Anzac Medical Society, from direct observation, gave the incubation period as from four to six days, which corresponds with previous observations made by French army surgeons who described epidemics of jaundice in French garrisons some years after the Crimean War. The symptoms at Anzac were: a loss of appetite, flatulent distension, vomiting and a slight rise of temperature. Tenderness was noted over the liver and gall bladder with the usual signs of mild cholaemia. The duration, 12 to 14 days. The general opinion was that treatment could safely be carried out in the unit by starvation and free purgation; only one fatal case had been observed.

The French pathologists, Sarrailhé and Clunet, working at Helles, considered the jaundice to be a type of paratyphoid gall bladder infection, while Martin at Lemnos was partly in agreement. It certainly was not spirochœtal jaundice.

Of the few pleasant memories of Anzac which medical officers retain, most will agree that the meetings of the Anzac Medical Society organised by the ever-resourceful Colonel Howse, were the chief; and the hours of deliberation spent in the 1st Australian C.C.S., now moved to safer and more commodious quarters south of the Sphinx in Reserve Gully, will ever be remembered. The meetings originated in a sanitary conference held in September at which all the sanitary officers attended. Each area of defence had a sanitary officer attached; these sanitary officers were not necessarily specialists, nor did they command sanitary sections. At the conference many questions of moment were discussed:—Chlorination of water; lice infestation:—one very enthusiastic officer of the Indian Field Ambulance demonstrated specimens of the body louse, which he carried in an inner pocket in test tubes with gauze coverings, and like the pelican of the desert, had nurtured with his own blood twice daily; the characteristic differences in pigmentation of the two types—the "grey back" of the white man and the black louse of the Gurkha—were admirably demonstrated to a hushed and devout audience. At the next meeting on the 14th October, 1915, the late Sir Victor Horsley addressed us on the treatment of head injuries in the field ambulances: the principles he then laid down were not subsequently modified to any great extent. Other meetings followed and one of the most interesting was that held on 22nd November, 1915, when the question of epidemic jaundice of armies was discussed. At a conference held in Alexandria about the same time the disease was considered to be a secondary symptomatic jaundice due to congestion of the common bile duct fol-

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lowing dysentery or "enteric" infection. Other discussions held by the Anzac Society dealt with the treatment of wounds in field ambulances, and the use of Eusol solution, recently introduced by the French surgeons at Helles. It is much to be regretted that the minutes of the Anzac Medical Society have not, as far as can be ascertained, been preserved. They would have formed a curious memento of the resourcefulness of the medical officers and of current opinion on local problems, not even yet thoroughly solved.

But the time was rapidly approaching when the Anzacs would be leaving Anzac and the M.E.F. abandon its hold on the Peninsula for a while. Several events of moment cast their shadow on the darkening days of the occupation. Lord Kitchener came; he saw—he hesitated—very much was at stake—but at last, reluctantly, he ordered the evacuation. The loose-end Anzacs assembled and cheered the great soldier lustily; it seemed to do him good; he smiled and waved his hand in almost affectionate response: he was at heart himself an Anzac. But all must be kept secret, the Turk must be educated to believe that we had taken up permanent winter quarters. To this end, all in ignorance of early departure, the erection of winter quarters by the garrison proceeded, warm clothing was issued and fresh material landed. Two events, however, must have brought the situation home to most observant officers with striking clarity. The first was the blizzard at the end of November. On the 28th there was a bitterly cold wind blowing from the north, the heavy rainfall of the previous days was now followed by snow; slush and snow made communications very difficult; the trenches were very muddy, and in places nearly full of water. The 54th Division marching out suffered severely, and had several cases of frost bite. The N.Z.M.R. Brigade who were relieving the 54th spent most of the night in the open under very severe conditions. All day there was a high wind, communications between ship and shore and the evacuations of sick and wounded became impossible. On the 29th snow lay on the ground, it was freezing hard, eight degrees of frost were registered; there was no hospital ship available; the growing number of sick and wounded still held up. Many small craft and one destroyer were blown shore at Imbros and at Suvla. The piers were washed away. Worse still, the Turk put down an unusually heavy bombardment with brand new high explosive on Lone Pine trenches, killing and wounding a very large number of Australians including Major Millar Thompson, A.M.C., Divisional Sanitary Officer of the

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2nd Australian Division. As the water barges had gone ashore at Imbros, no water could be landed at old Anzac. Troops were on quarter rations, 2 pints daily, mule transport was almost impossible, the dere were filling. On the 30th there was cold, bright, clear weather. There was no ferry boat to Mudros. The hospital ship was working with ships' cutters and patrol boats, 100 wounded and 378 sick were evacuated in this way. The "Beetles" being too low powered could not face the sea. The water shortage was acute; the night temperature fell to 24 degrees F.

The blizzard, if it killed the flies, brought with it a very dreadful loss of life due to exposure, chiefly at Suvla. In many cases both Turk and Britisher was drowned in the trenches. Frost bite of a severe type was seen in the Indian Brigade, several cases of gangrene of the feet occurred; but with the New Zealanders and Australians, things were not so bad, only three cases of frost bite of mild type were admitted to the New Zealand Field Ambulance and there was a proportionate incidence in the other ambulances of the Division. Strenuous efforts were made by all senior officers to counter the danger and a providential issue of gum boots about this time contributed to the success of their preventive measures.

A few cases of mild trench foot had been seen during October in the 7th Australian Brigade then holding the Apex. The weather was not cold at the time, the trenches were quite dry. The cause of the trouble could not be attributed to cold or wet, but it was found that the soldiers affected had not taken their boots off for many days. The tightly fitting pantaloons and puttees were the chief factor in determining stasis in the foot. All these cases had the typical signs of trench foot, swelling, tenderness, and acute pain of a neuralgic type, with areas of blunted sensation in the usual distribution, but they all did well and recovered shortly. Instructions were issued that men should remove their boots at stated periods when in support, and that puttees should be worn loosely applied. There was no trench foot following the blizzard: the condition then seen was true frost bite.

The water and ration supply had become an increasing anxiety for the Administrative Staff at Anzac during these gales: mainly dependent upon supplies from Imbros, when the frequent gales prevented the daily replenishment of the reserve tanks, a water famine threatened. A condenser plant was in course of construction but owing to the "change in policy" unknown yet

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even to the chief engineer officer, the plant was recalled. The filling of the Dere menaced the life of our most important well at No. 3 outpost, as it was just at the mouth of the torrent bed. Owing to water shortage, the only Thresh sterilizer at Anzac went out of commission.

A ration shortage was also evident at the end of November, a daily supply of fresh bread could not be maintained and biscuit was a poor substitute, as there was much gingivitis and dental trouble. On many days the available ration fell much below the value of normal war rations. A sanitary officer estimated several daily issues as furnishing from 3,300 to 3,400 calories each, and it was not possible for the men to utilise the full carbohydrate allowance in this ration as it was hard biscuit. Transport difficulties on land, rough seas, and absence of adequate shipping and piers contributed to a food and water shortage which, although never acutely felt, probably contributed during the last few weeks to weaken the garrison, whose metabolic demands for heat formation were not being adequately met. Certainly an appreciable loss in weight was experienced by nearly every one towards the end of the month. During the first three days of December, no less than 40 officers and 1352 O.R. were evacuated sick out of a total corps strength of 25,900; of these, some 24 from Anzac Corps by effects of cold.

Another event of minor importance early in December was the bombardment of the 16th C.C.S. at No. 3 outpost, with 5.9-in. howitzer high explosive shell, entailing serious loss of life amongst the sick and wounded. The bombardment was intended for the Mountain Battery, a biscuit toss away, but the overs fell into the marquees of the C.C.S. No Red Cross convention can guarantee the protection of a medical unit which persists in keeping bad company: a noisy party of screw guns to wit; lack of room was our only excuse—the Turk could not be held blamable. There were 280 cases in the C.C.S. of which 40 lying, one shell exploded in the surgical ward where the lying cases were, killing and wounding many of them—the ward was wrecked. The R.A.M.C. officers and men stood by and cleared the patients into the adjacent sap—shells falling all the time—until every patient was removed; there were 4 patients killed, 11 wounded. The shells were of a new type and horribly effective, it was clear now that Turkey was getting plentiful supplies of new ammunition and howitzers, and that if Anzac was not starved out or frozen by gales or blizzards, it would shortly be shelled out of the Peninsula. The heavy casualties at Lone Pine and at No. 3 outpost from shell

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fire and the daily dusting of the forward trenches at the Apex made this only too clear. Lord Kitchener's advice to dig in had come in time. It was now clear to all that evacuation was the only way, and by the 10th the preliminary orders were issued by General Birdwood.

The medical arrangements for the evacuation were based on the assumption that there would be serious casualties when the rear guard parties were embarking, and that it would be necessary to leave many of the wounded behind in charge of a limited staff of medical personnel under the protection of the Geneva Cross, and in accordance with the Convention. I refer now to the arrangements made at Anzac only. The evacuation of troops had to be conducted in two stages: first, a reduction of the garrison to a minimal strength, calculated to hold the position for from two to four days, and a final embarkation of all guns and men to be completed in two nights. Hold or "keep" positions covering the beaches were defined; the embarkation of the small rear guard was to be at Walker's Ridge and carried out in reverse order to the landing operations. It was during the final stages that casualties might be expected if the Turks became aware of our manoeuvre and followed up. During the preliminary steps to be completed before the 19th, the usual arrangements for the evacuation of sick and wounded would be adhered to, but during the rear guard movements, to be completed by the 20th, the lightly wounded men were to embark with the fighting troops. Two hospital lighters were to be provided for the conveyance of seriously wounded, and the Vice-Admiral would provide boats off shore throughout the final stages when stragglers or walking wounded came down to the beaches. A proportion of medical personnel with accommodation for seriously wounded was to remain on the Peninsula until the evacuation had been completed, in order to tend such casualties as could not be embarked with the last of the rear guard. The following morning permission would be asked of the enemy, under a white flag, for the medical personnel and the wounded to be embarked on the hospital ships, which were to remain. The total of medical units to be evacuated comprised about 8 field ambulances; 4 mounted field ambulances; 3 casualty clearing stations; 1 stationary hospital, the 1st Australian; 2 Imperial sanitary sections; the 5th Advanced Supply Depot of medical stores; and the New Zealand Dental Hospital. The tent subdivisons of the ambulances of the New Zealand and Australian Division were closed on the 12th and, curiously, the secretary of the Anzac Medical Society issued notices for a meeting to be held on the 19th. On the 12th the 16th C.C.S.,

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the Australian Stationary Hospital, and 3 field ambulances embarked. All sick—some 900 in all—were evacuated to hospital ship during the day. Some 2091 troops were embarked at night. On succeeding nights equivalent numbers of troops with a proportion of medical units embarked. The 18th was the first day of the final embarkations, the troops now remaining to cover the Anzac positions comprised 836 officers, 17,789 O.R., say a division, with field ambulance personnel, and 2 C.C.S.'s, the 13th at Walker's Ridge and the 1st Australian C.C.S. 30 bearers from the ambulances had been distributed to R.M.O.'s, in proportion, to assist the removal of wounded on the last day; the New Zealand Field Ambulance detailed 2 corporals, and 12 men, N.Z.M.C. to the New Zealand Brigade and the N.Z.M.B.F.A., 2 corporals and 5 men to Russell's Mounted Brigade. The tents and the dressing stations of both these field ambulances were, by orders, left standing with a sufficient supply of blankets, lights, dressings, drugs, food and water, and the red cross flags flying. R.M.O.'s were instructed not to attempt to remove seriously wounded but to dress them and to leave them in the dressing stations. The medical units to remain behind were the 13th C.C.S. and the 1st Australian C.C.S., they were at Walker's Ridge near the pier from which all embarkations of the New Zealand and Australian Division were taking place. Old Anzac was using William's pier near Brighton Beach, at South Anzac. At the C.C.S. encampment there was accommodation for 2000 cases, adequate medical supplies and comforts, with food and water for 14 days. It was decided, that in the event of all the casualties being safely evacuated on the last day, the C.C.S personnel would also be embarked and that, in the event of a smaller number of wounded than anticipated remaining, the post of honour would be given to the 1st Australian C.C.S.; the first to land the last to embark.

The Turks were apparently quite unaware of our intentions. They were busily employed digging and repairing their barbed wire. Fires had been lighted by us in many of the sites previously occupied; all movements had been carried out at night. No unusual number of transports or hospital ships was visible by day, the weather very favourable, calm with moonlight and thick fog at night. On the penultimate night the two New Zealand Ambulances and the 3 Australian Light Horse Ambulances embarked at 7 20 p.m., on one of the "beetles" boarding the H.M.S. *Mars*, a pre-Dreadnought, where the officers, especially the surgeon, gave them a hearty welcome, a very good supper, and found them a place to bunk in. About 7,700 in all got away that night.

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Approximately 10,000 troops remained, these in turn were safely embarked the following night from three piers, almost the last to leave being the staffs of the casualty clearing stations. There was only one casualty. The following morning our warships found the Turks busily engaged in shelling the abandoned trenches.

From Mudros the Division sailed by various transports to Alexandria. Christmas day was spent at sea; the A.D.M.S., Col. Begg, on board the *Huntsgreen,* with the New Zealand Field Ambulance, presided at an N.Z.M.C. dinner party, amidst a scene of opulent luxury, as it appeared to the Anzac Garrison.

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CHAPTER VII.

Mobilisation of the New Zealand Division.

After disembarkation at Alexandria about the New Year of 1916, the two infantry brigades of the New Zealand and Australian Division entrained for Ismailia; the New Zealand Brigade went into camp at El Moascar, the 4th Australian Brigade near the central railway station; the mounted brigades reassembling at Heliopolis. The camp, El Moascar, was situated in the desert about a mile to the westward of the town and was bounded on the southern side by the Sweet Water Canal, which separated it from Lake Timseh, and on the eastern side by the Abbasia Canal. To the north was open desert, mainly hard sand, and to the westward cultivated ground by the banks of the Canal which accompanied the railway to Cairo. The town of Ismailia, which owes its origin to the French engineers and employees of the Suez Canal Company, is situated at the junction of the Port Said, Suez, and Cairo railway lines. The European portion, built in the French style, cheerful spacious and well ornamented by public gardens and leafy boulevards, presented a fairy-like illusion of sumptuousness to the jaded troops from Anzac, so long exiled from any semblance of civilisation, more especially as life in the desert camp was at first very uncomfortable. There was a serious shortage of tents; most of the men were in bivouac only, which they found less comfortable than their old dug outs on the Peninsula; many indeed, reverting to their cave-dwelling habits, attempted to burrow into the sand. The nights were cold and there was a shortage of blankets, and at times even of rations. Equipment and baggage was still detained at Alexandria owing to congestion on the railways. The officers and men had with them only those few effects which they had carried on the person from Anzac. By the 8th of January conditions were improving but there was still much overcrowding in the tents when the 7th Reinforcements arrived. The transport and horses, which had remained at Zeitoun, were now coming into the camp, further reinforced, on the 17th of January, by the 2nd Battalion of the New Zealand Rifle Brigade, recently employed on the western frontier in guarding the railway during the Senussi operations. The 4th Australian Brigade joined us at Moascar shortly after, and

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by the end of January the camp had assumed a more orderly and comfortable appearance. A good water supply had been piped in from the Ismailia water works by the N.Z.E. Extra tents had been procured. The usual streets of canteens and bazaar shops had been erected by Maltese and Egyptian traders and a certain number of Institutes were in course of construction by the Y.M.C.A. and the Salvation Army. The friendly hospitality extended to the officers of the Division by the French Club, "Cercle du Canal de Suez," was gratefully appreciated and a priceless boon after the miseries of Anzac.

As important changes were pending in the organisation of the N.Z.E.F., now grown to dimensions far exceeding those of the "Main Body," we must review very briefly conditions at the Bases up to the end of 1915. In New Zealand, recruiting for the N.Z.E.F. was still on a voluntary basis, but it was stimulated to some extent by local recruiting committees. The numbers offering were constantly in excess of the military requirements of the moment, although the requests of the Imperial Government for reinforcements on a higher scale than previously agreed to were readily complied with. By maintaining the training of the Territorial Force and the Cadets, the N.Z.E.F. was continually fed by an uninterrupted stream of officers, N.C.O.s and men, the majority of whom having served for four years in the Territorial Force helped to stiffen the reinforcements drawn from the civilian population. Recruiting, attestation, medical examination and posting to training drafts admitted to camp at stated intervals, bi-monthly, was a function of the Territorial Force; sorting, training and final assessment of medical fitness for active service was in the hands of the Permanent Staff, combatant and medical, of the Reinforcement Camps. The regulations for the medical examination of recruits were similar to those prescribed in 1911 for examination of candidates for admission to the New Zealand Permanent Staff, and were almost identical with requirements set out in R.A.M.C. Regulations, 1905, Appendix No. 16. The age limit was from 20 to 40 years. Under instructions issued by the D.M.S. all necessary arrangements, including the selection of examiners, were made by the Territorial P.M.O.s of the four Military Districts, as a rule, experienced N.Z.M.C. officers of good professional standing. N.Z.M.C. officers on the active or reserve list were selected as examiners, and in outlying districts a certain number of civilian practitioners were employed and as neither the P.M.O.'s nor the examiners were whole-time men, a fee of 2/6 per recruit was payable. In the large centres the medical examinations were carried out at

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night, mainly in order to suit the convenience of the recruits and of the examiners, who were engaged in private practice during the day time. It does not appear that the examinations were unduly hurried, the number of men examined per hour being from 7 to 8 on a average, which was in agreement with Army Council Instructions of December, 1914. The method usually adopted was the team system: each of the examiners being responsible for a portion only of the physical inspection. In the larger centres, where closer supervision by the P.M.O.s was maintained, there was efficiency; but in the outlying districts, where the selection of examiners was more difficult to adjust, the conditions were not so satisfactory. As early as November, 1914, it was reported that recruits were not being examined in accordance with prescribed regulations and that an undue proportion of men were found to be unfit for active service after arrival in camp. In the general enthusiasm and impetuous rush to join the colours, many men had hastily abandoned their employment, sold their farms or businesses, and had sustained considerable expense in reporting to recruiting centres remote from their homes. To such men—accepted by the Recruiting Medical Officer as fit, only to be rejected shortly after arrival in camp by the Permanent Medical Staff—the disappointment was keen, the refusal a disgrace, and the whole matter a subject for bitter complaint, often to the Defence Minister in person—sometimes the basis of a claim for damages or compensation. Ill informed criticism and accusations appearing in the daily press did much to snake the confidence of the public in the validity of the whole of the medical examinations, more especially where there was manifest a divergence of opinion: as in the instance of a man rejected at one centre, and, later, accepted at another. In the opinion of the Defence Minister the results of the examinations were not at all satisfactory, although he was quite prepared to admit the inherent difficulties in obtaining uniformity of results. In a statement made by him in the House of Representatives early in September, 1915, he made it clear that the irregularities complained of applied to a few men only, that most of the recruits who had passed the local medical tests stood all subsequent tests in camp. He was also convinced by information he had received that, in a few cases, recruits had deliberately tried to get the better of the medical officers by concealing disabilities at the time of the first medical examination; hence he did not consider it reasonable that compensation should be paid in such circumstances. To remedy these matters, a Supervisory Committee of two civilian medical practitioners, Dr. G. Anson, M.D., and Dr. H. A. de Lautour (Lt.-Col.

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N.Z.M.C., retired), was established in order to assess the revision of classification at Trentham. It was found by the committee that from one to two per cent. of the recruits coming into camp after local medical examination were classed unfit on revision. P.M.O.s of districts were enjoined to supervise examinations of recruits in their district with the greatest possible care, in order to remedy the conditions which had given rise to so much adverse criticism, and they were instructed, no doubt in deference to public opinion, that the standards of physical measurements might be relaxed at the discretion of medical examiners, and that, owing to the establishment of dental clinics at the standing camps, remediable dental defects should no longer be considered a disqualification. Some pressure was brought to bear on P.M.O.s in the direction of urging them to accept examiners in outlying districts of whose qualifications for the work either they could not approve, or of which they had no personal knowledge—all this for the convenience of "back-block" residents who could not attend the larger recruiting centres without inconvenience and loss of time, and in order that the recruitment of volunteers might not be discouraged. All these difficulties had already been experienced in England, and in 1915, were under close examination with a view to betterment.

One factor in the problem which had attracted much attention was the number of rejections, then averaging about 25 per cent. of the recruits: the public of New Zealand had not yet realised the extent of physical unfitness normally present—they were to be more fully enlightened and disillusioned later on. Having in view the fact that the 6th Reinforcements arriving at Lemnos in October, 1915, on being classified, were found to show a moderate percentage of unfit by pre-war conditions, the 25 per cent. of rejection in New Zealand was certainly a generous assessment. Owing to complaints from Trentham that the physique of the 7th Reinforcements was not so good as that of previous drafts, the Surgeon General rescinded the previous instructions and increased the stringency of the examination.

As early as Januray, 1914, General Godley had realised that an experienced R.A.M.C. officer was required in New Zealand, to act as a Staff Officer to the Territorial D.M.S. and as an instructor to the N.Z.M.C. Colonel Robin, in 1915, had recommended the appointment of a "regular" D.M.S. in his annual report—ultimately the New Zealand Government decided to apply to the Secretary of State for a senior R.A.M.C. officer of wide experience to act as D.G.M.S. to the Military Forces in New Zealand. Colonel R.S.F. Henderson, R.A.M.C., H.P.K., was selected,

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by the Home Authorities and arrived in the Dominion on the 6th of September, 1915, to take up his duties with the local rank of Surgeon General. Two matters of importance had been attended to by this officer prior to his departure, at the request of the New Zealand Government: one was to obtain a supply of the latest medical publications and sanitary memoranda, and a quantity of army forms and returns generally in use in the Medical Department, of which there were none actually in New Zealand; the other was to secure the services of an experienced Warrant Officer of the R.A.M.C. to act as his Quartermaster. Sergeant-Major Gibbs, R.A.M.C., of the 9th Field Ambulance, B.E.F., then in France, was selected to fill this appointment. Colonel Purdy, N.Z.M.C., remained on at Headquarters as Territorial D.M.S., and, later became a whole-time officer.

The new D.G.M.S. found, on arrival, in September, 1915, a reformed camp at Trentham, now all hutted, well roaded and drained; the work had been put through in a very short time by the Public Works Department employing very large gangs of workmen. A large "model" camp at Featherston, some 27 miles north of Trentham on the same railway system, was in course of construction, and was to provide accommodation for 7000 men. At Trentham as P.M.O., Major P. O. Andrew, N.Z.M.C. (Reserve), had replaced Lieut.-Col. Morris now commanding the Victoria Military Ward at Wellington Hospital. The general health of the troops was stated to be above the average, the camp population much reduced. The measles epidemic had reached its acme in July when 341 cases were reported; the first diagnosed cases of C.S.M. were observed about the 8th of July before the break up of the camp. The measles epidemic subsided but the C.S.M. outbreak continued. The vital statistics for the year, 1915, in New Zealand, show that an outbreak of cerebro spinal fever took place in July, when 40 deaths from this cause were registered. Only one death from this disease had been registered previously in this year, in January. In August there were 20 deaths certified; in September, 13; two, four and two deaths were certified in October, November and December, respectively. There was an increase by 100 per cent in the mortality rate of measles, but no evident increase in the death rates from simple meningitis, pneumonia, bronchitis, or broncho-pneumonia—which is suggestive that some of the deaths registered prior to July as due to measles were in reality deaths from cerebro spinal fever. The disease was little known in New Zealand, and was of an aberrant type when first recognised at Trentham: the rash and the catarrhal

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symptoms were especially marked features. In the month of July 32 cases of cerebro spinal fever were notified from Trentham Camp, with 22 deaths. Two cases were reported in August and two in September, after which the disease disappeared for a time. A few sporadic cases were reported from the casual camps formed after the break up of Trentham or amongst soldiers on leave. The carrier rate investigated at Dunedin in a small sample of soldiers on leave was unusually high: 52 to 70 per cent.; whereas the carrier rate in 43 civilians swabbed at the same time was about 12 per cent. Undoubtedly the general carrier rate of the civil population was increased as there was a mild epidemic of the disease in the civil population in 1915 and 1916. Owing to a lack of hospital accommodation in the camp the bulk of the sick were treated in the tea kiosk on the Race Course, a large polygonal building with open sides, which afforded considerable floor space for beds, was easy to work, and provided an open air ward well suited to the treatment of pneumonia and cerebro-spinal meningitis. This building became a model for future emergency wards building or built in Trentham and in other military centres.

As there was no supply of Flexner serum available in New Zealand or, then, in the Commonwealth of Australia an autogenous vaccine was prepared by Mr. T. Hurley the Government Bacteriologist, in the Wellington Laboratory, and was used, it is said, with encouraging results. Supplies of serum were cabled for to London and became available in late September. Prophylaxis was maintained by isolation of contacts, rigidly enforced, by nasal sprays and by general gargling with permanganate solution. A small laboratory was opened at the Trentham Camp for the purposes of throat swab examinations; an investigation of the carrier rate on a large scale was not possible for obvious reasons: the technique of this procedure was not as yet elaborated to that degree of facility and refinement which was made possible in later years. In the summer months, the epidemic having subsided, the troops returned to Trentham in limited numbers. Professor Champtaloup of the Dunedin University rendered very valuable assistance in all this work. His death in 1922 was a great loss to the Medical School which all members of the profession and his one time pupils, widely deplore.

One curious fact in connection with the epidemic was that the incidence was usually in the inhabitants of the huts and not amongst the tent dwellers. Professor Adami in his account of the epidemic amongst Canadian troops in Bulford in the winter of

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1915, notes the same peculiar distribution, which he attributed to overcrowding in the huts and the increased risk of a carrier infecting a larger number of men.*

In October, 1915, a training camp for Ambulance Details and N.Z.M.C. generally, had been established at Awapuni Race Course near Palmerston North, at first commanded by a combatant officer under the direction of the O.C. Military District. The success of this camp was assured from the start, when Major J. Hardie Neil, N.Z.M.C., was appointed Assistant Camp Commandant and became responsible for the training of all N.Z.M.C. details. Certain Territorial Ambulances and Medical Officers were sent into this camp for their annual training, and the Medical Officers concerned as well as the O.C. District expressed the greatest possible satisfaction with the results attained. The need for a depot had been long felt by N.Z.M.C. officers in New Zealand, its realisation during the war and its undoubted efficiency was a source of considerable gratification to officers of the Corps. Some complaints had been made by Medical Officers of the N.Z.E.F. in Gallipoli of the lack of training of certain Medical Reinforcements officers and men; the excellent training and fine esprit de corps fostered at our depot was shortly to remedy this deficiency. Early in 1916 the Surgeon General was moving to have the depot placed under the command of an N.Z.M.C. officer, and ultimately when Lieut.-Col. Hardie Neil embarked for Egypt in February, 1916, in command of the two Sections of the Rifle Brigade Field Ambulance, which he had recruited and trained, he was replaced by Lieut.-Col. Tracey-Inglis, N.Z.M.C., recently returned from the first commission of the N.Z.H.S. *Maheno*, as Commandant of the depot when control passed to the D.G.M.S. The No. 1 N.Z.H.S. *Maheno* 10 officers, 67 O.R. under the command of Lieut.-Col. J. S. Elliott, N.Z.M.C., sailed in November carrying N.Z.M.C. reinforcements to Alexandria.

By the 1st of January, 1916, New Zealand had despatched 27,902 officers and men to the N.Z.E.F. Of these, 2638 were dead, missing or prisoners of war; 4,857 were wounded, or sick in hospitals in the Mediterranean or England; and 3111 had returned to New Zealand. The Medical Units despatched were:—One Mounted, two Field Ambulances; two Stationary Hospitals; and two Hospital Ships. Including the Regimental Medical Officers and the Reinforcements, up to and including the 7th, the total Medical personnel embarked from New Zealand comprised 124 officers, 1150 other ranks. These figures include 13 dental officers

* The War History of the C.A.M.C., 1914, 1915, Col. J. C. Adami, C.A.M.C.

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as they formed part of the N.Z.M.C., being officers of the Corps until 1916, when the New Zealand Dental Corps was constituted. There were now over 17,200 valid New Zealand troops in Egypt and many reinforcements on the water, including part of the New Zealand Rifle Brigade, a unit formed in New Zealand from current reinforcements.

The Imperial Government in view of the large numbers of New Zealanders available, suggested the formation of a New Zealand Division; this was ultimately agreed to by the New Zealand Government in February, 1916, and the mobilisation of the Division was authorised by Corps Routine Orders on the 18th of February. Major General Sir A. H. Russell, K.C.M.G. assumed command of the Division.

The Medical Headquarters consisted of: Colonel Begg, C.M.G., A.D.M.S.; Major A. R. D. Carbery, D.A.D.M.S. The Divisional Sanitary Section, formed at Anzac for the New Zealand and Australian Division, had been disbanded on arrival in Egypt, the Australian Details, of which it was chiefly constituted, returned to their respective Units. A New Zealand Sanitary Section, Captain Connor, N.Z.M.C. commanding, was formed early in February from details carefully selected from N.Z.M.C. and other personnel; it included a borough engineer, an architect, several draughtsmen and a number of skilled craftsmen. A course of instruction in field sanitation was initiated for this unit and continued uninterruptedly for six weeks; material assistance was given by the 46th Sanitary Section, under Captain Rose, R.A.M.C., then at Ismailia. There remained one field medical unit to be mobilised in order to complete the Divisional establishment. At first the formation of the new Field Ambulance presented certain difficulties as there was a shortage of medical personnel. The A.D.M.S. in a report on the matter dated 15th February, 1916, comments:—"The shortage of N.Z.M.C. personnel in the field has been largely due to the ever increasing establishments maintained in L.O.C. units and the base formations. At Anzac we were unable even to keep up the strength of two ambulances owing to the reinforcements being absorbed at the base. Unless increased drafts of reinforcements are made available from New Zealand, it will be quite impossible to keep medical units supplied. It should be a principle that field units have first claim on reinforcements."

The important question of N.Z.M.C. reinforcements attracted attention during the period of reorganisation. In November, 1914, the Imperial Government requested that reinforcements should

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be supplied by New Zealand on a basis of 25 per cent. for infantry and mounted rifles; and for artillery 7 per cent, per month; other formations, including medical units, at the rate of 30 per cent. per annum. Throughout the Gallipoli campaign on account of the high rate of wastage special requests had been received in New Zealand for extra N.Z.M.C. personnel, and steps were taken to meet these demands. It now seemed advisable that a higher scale of medical reinforcements should be maintained: it was suggested that at least 70 N.Z.M.C. would be required monthly, chiefly on account of the new formations provided, or at the rate of 80 per cent. per annum instead of 30 per cent.

There were at this time some 89 officers, N.Z.M.C., and 960 other ranks in Egypt. A few details, medical students, who had joined the Main Body, were returned to New Zealand in February, but at the time of the formation of the No. 2 Field Ambulance a certain number of men were added to the N.Z.M.C. strength from the infantry units. These details with the available Medical Reinforcements and the new Field Ambulance from New Zealand, provided for the increased personnel of the Division. The new ambulance, to be designated No. 2 New Zealand Field Ambulance was ultimately formed by utilising "B" section of the Second Field Ambulance formed in New Zealand in 1915 and already in Egypt and a draft of officers and men from the Main Body Ambulance which had served in Gallipoli, with a certain number of details drawn from the Auxilliary Hospital—part of the No. 2 New Zealand Stationary Hospital established at Moascar Camp in January, 1916, under Major McGuire, N.Z.M.C.—and a proportion of stretcher bearers drawn from infantry reinforcements. Lieut.-Col. Murray, N.Z.M.C., was appointed to command this unit on the first of March. The two sections of the second Field Ambulance formed in New Zealand, and known as the Rifle Brigade Field Ambulance, under the command of Lieut.-Col. Hardie Neil, N.Z.M.C. late Commandant of the Awapuni Depot, became the No. 3 New Zealand Field Ambulance of the New Zealand Division. All three ambulances were now engaged in training

A second Anzac Corps was in course of formation: General Birdwood still retained command of the first Anzac Corps, General Godley was to command IInd Anzac of which the New Zealand Division would be a part. Besides assuming command of a Corps, General Godley still retained his statutory appointment as Commander of the N.Z.E.F. for the administration of which he was responsible to the Dominion Government. At the time of the visit

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of the New Zealand Commissioner, Lieut-Colonel Heaton Rhodes, to Egypt in 1915, the appointment of a D.D.M.S. to the N.Z.E.F. was in contemplation. In January General Godley appointed Lieut.-Colonel Parkes, N.Z.M.C., D.D.M.S., to the N.Z.E.F. The N.Z.E.F. base units, then in Egypt, comprised. the New Zealand Infantry Training Battalion, some 4000 strong at Zeitoun—an infantry base depot—the emergency clearing camp, Zeitoun, a formation controlled by N.Z.M.C. comprising "A" class men, recently discharged from hospital, the sick admitted for observation from the training depots, and the N.Z.M.C. reinforcements. There was also a New Zealand Overseas Base at Gizeh which was practically a Command Depot as it consisted of category men; and at Suez, the concentration camp, or Discharge Depot. Attached to each of these units there was a certain number of officers and O.R. medical personnel. The base details were classified in three categories at this time: "B" men, permanent "B" men, and "C" men. The temporary "B" men were those who had recently been discharged from hospital or convalescent hospital or were invalided by boards held in the divisional area. They were drafted to the Base Depot at Gizeh where they were classified weekly by the S.M.O.—the number in February being about 1000. Permanent "B" men were such as were unfit for active service with front line units; they were examined by a standing board who determined the classification. They were detailed to Base Depots, Headquarters N.Z.E.F., and to the New Zealand General Hospital. The "C" class men, after a final invaliding board, proceeded to the Suez Concentration Camp where they awaited return to New Zealand, or discharge to the United Kingdom if their homes happened to be in England.

At the time of the formation of the Division it was considered that there was an undue proportion of fit men both in hospital and the various depots. This view was shared by the D.M.S., M.E.F., Surgeon-General Bedford. There was a tendency, it was said, to treat soldiers invalided from Gallipoli with undue leniency. Many had been invalided to England or New Zealand for trivial conditions of disability. In September, 1915, there were 2,927 soldiers of the N.Z.E.F. in England whilst the number actually at Anzac was somewhat less, 2,840; at this time only 16 per cent. of the troops despatched from New Zealand were in the field. General memoranda dealing with the return of fit men to New Zealand had been cabled to Egypt by the Defence Minister. It is probable that Invaliding Boards of the period were not as exacting as was desirable; they were in many instances ill-provided with case sheets

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and essential documents at the time of boarding. In view of these complaints every effort was now made to get together all available fit men in Egypt to complete the personnel required by the Division.

The important question of promotion in the N.Z.M.C. was at present under revision; a gradation list was in course of compilation. Owing to the fact that unit promotion in the field units had been the rule since the Expeditionary Force had first sailed, and that promotions were at the same time being made in New Zealand, there was some confusion and some dissatisfaction amongst the N.Z.M.C. officers and N.C.O.'s of the so called "Main Body." By regulations issued by the N.Z.E.F. the promotion of N.Z.M.C. officers now became a Corps matter, as the whole of the Expeditionary Force, N.Z.M.C., was classed as one unit for the purposes of promotion, but the promotion of N.C.O.'s still remained a unit arrangement as promotion up to the rank of sergeant could be approved by the O.C. of any medical unit. In one instance a water duty man had been promoted to corporal in Anzac by his battalion commander! The rank of staff sergeant did not, as yet, exist in the N.Z.M.C. Several recommendations had been made by officers commanding for promotion to this appointment which were not approved by the A.D.M.S., as he was of opinion that the experience gained, so far, by N.C.O.'s was not sufficient to warrant the extra rank. Two staff sergeants arriving from New Zealand with the Rifle Brigade Field Ambulance were obliged to relinquish the appointment on joining the Division. The method adopted at the Awapuni depot was to grant temporary rank only, which lapsed on joinging unit with the Division. There was as yet no gradation list for N.C.O.'s.

One other administrative matter we must consider. The New Zealand dental service was now to be reorganized; Captain Finn, D.S.O., N.Z.M.C., the dental officer whom we have seen evacuating wounded from the No. 3 pier at Chailak Dere, for which good work he had a D.S.O., was now appointed as acting administrative dental officer, attached to N.Z.E.F. Headquarters. The ideals of a compact dental service attached to a Division were not as yet fully attained. The opinion of the G.O.C. N.Z.E.F., at this time was that:—The O.C. of a medical unit to which a dental section was attached should be able to undertake the administration of the section so that a separate Dental Corps Headquarters was unnecessary. A dental section comprised:—one dental officer, rank: captain; one corporal, dental mechanic; one private, dental orderly; one private, clerk. Two dental sections were attached to

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each field ambulance with nine panniers of equipment containing surgical appliances and prosthetic plant; the total weight of the equipment—7½ cwt.—thought to be overmuch for the ambulance transport; it was reduced later. In all, 11 dental sections were allotted to various units; including two sections to the New Zealand Infantry base depot, which was to accompany the Division, and one to the New Zealand Stationary Hospital. The Dental Stores Depot, holding a reserve stock of material, was mobile and had a staff of 1 Q.M. sergeant and one packer under the A.D.O.

By the end of March the New Zealand Division was nearly complete, the 7th, 8th and 9th Reinforcements had arrived; the three Brigades, the 1st, 2nd and the New Zealand Rifle Brigade were at full strength and the Divisional Medical Units, the 1st, 2nd and 3rd Field Ambulances and the Divisional Sanitary Section, were mobilised and undergoing a course of training. The necessary medical personnel had been attached to the various formations.

At the end of January the 1st and 2nd Australian Divisions had occupied the front line, across the Canal, the New Zealand and Australian Division remaining in reserve in Ismalia. The New Zealand Mounted Brigade had been holding the outposts since February. By the 5th March our Division was moving out to Ferry Post and taking over the line vacated by the 2nd Australian Division now coming into Moascar for final preparation for entrainment for Alexandria and the Western Front. By the 8th the moves were completed and one section of the No. 2 Field Ambulance with the N.Z.M.B.F.A. were marched out to the canal defences to serve the Division and the N.Z.M.R. Brigade. "A" and "C" Sections of the Rifle Brigade Ambulance, henceforth known as No. 3 New Zealand Field Ambulance, arrived at Ferry Post from New Zealand on the 16th.

The No. 1 New Zealand Stationary Hospital, Lieut.-Col. McGavin commanding, hurriedly recalled from Salonika, took over the Auxiliary Hospital at Moascar. The New Zealand Stationary Hospital as it was now named, reorganised and re-equipped after the torpedoing of the *Marquette* was at first employed as a C.C.S., later as a stationary hospital. The total number of patients treated during its stay at Salonika was 6989 including 500 eye cases and 1000 dental; the work of the unit was very highly appreciated by the local medical authorities. They had only 48 hours notice of movement and left Salonika Harbour, sailing this time in a hospital ship, arriving safely at

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Port Said on 9th March, 1916, and Moascar on the 12th. The establishment of a stationary hospital at Moascar was in part necessitated by the high rate of sickness prevailing in the New Zealand troops in Egypt and the overcrowding of the New Zealand General Hospital at Pont de Koubbeh which had 807 beds occupied. By the middle of February the divisional sick rate was as high as 25 per 1000 per week.

Shortly after arrival in Moascar there was a mild outbreak of C.S.M. mainly in the 4th Australian Brigade with sporadic cases amongst the New Zealand troops. The originating infections no doubt, came from the Reinforcements, the contributing causes being cold weather, a shortage of tents, and a lack of blankets, causing a huddling together at night in the overcrowded tents. The carrier rate was shown to be very high: out of 114 contacts isolated, 41 were bacteriologically examined, of these, 9 were positive, giving a carrier rate of 21 per cent. It was well known at this time that the carrier rate was invariably high during epidemics. Dr. Arkwright, of the Lister Institute, working at Bulford in the winter of 1914-15 with the Canadian pathologists, notably Captain Ellis, C.A.M.C.—afterwards known to the New Zealand Division as O.C. No. 5 Canadian Mobile Laboratory at Baillieul—was able to demonstrate the fact that the carrier rate amongst non-contacts was often higher than amongst the contacts, that is, tent or hut mates. It seemed evident that room infection was not the usual cause of the disease but that the centre for dissemination might be the canteen or institute, a fact which would more clearly explain the sporadic nature of the incidence. The outbreak in the troops at Moascar was closely associated with rose measles, widely spread in the 8th and 9th Reinforcements and for which they were quarantined on arrival, and the catarrhal infections—mitigated in Egypt by the superior climatic conditions and absence of humidity—which had been observed in New Zealand and elsewhere as concomitants of epidemics. Over a dozen cases were notified amongst the New Zealand troops, most of which terminated fatally. The preventative measures adopted were:—isolation of tent contacts and bacteriological examination of throat swabs, universal throat gargling parades, twice daily, using permanganate of potash 1-1000 solution. The numbers accommodated in tents was reduced from 12 to 8 men in circular tents, and from 25 to 16 in E.P. tents. The isolates were released from quarantine following one negative throat swab; but positives suffering from naso-pharyngeal irritation or catarrhal symptoms were subjected to local treatment and were retained in isolation

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for three weeks. In the division a special method of universal fumigation was devised. A circular tent was sprayed with five per cent. solution of commercial formalin in water—as for the ordinary disinfection of rooms—by means of a Mackenzie sprayer producing a fine misty spray. The ventilators of the tent were sealed with paper, a formaldehyde lamp stood upon the floor so as to concentrate the vapours in the warm humid atmosphere. Under the supervision of a medical officer the men were passed slowly round the pole of the tent with instructions to take deep inspirations of the vapour through the nostrils, the mouth closed. Very few inhalations could be tolerated owing to the density of the formalin content. It was necessary to supply the spray manipulator, generally a N.Z.M.C. detail, with a gas helmet so that he could renew the misty deposit on the tent walls at repeated intervals. As the result of experimentation it was found that 1 gall. of the solution sufficed for a company; 32 oz. of commercial formalin for 1000 men; 2 galls. for 10,000. The time required was 40 minutes for a company, 220 men; and with four tents in use, a battalion could be passed through in one hour. As formaldehyde vapour acts best at temperatures approaching 76° F. and in the presence of watery vapour, the walls of the tent were first sprayed with hot water before the solution was applied; and, in order to maintain a high temperature midday was selected for the operation. The mobile laboratory, accommodated in a railway laboratory waggon furnished by the Egyptian Government and stationed at Ismalia, experienced the same difficulties in handling large numbers of isolates for bacteriological examination as were encountered in New Zealand. Captain Horne, I.M.S., the officer in charge, found that, without a very much larger staff, it would not be possible to deal with all isolates by throat swabbing, consequently samples of the contacts only were examined. The sanitary measures adopted sufficed to extinguish the epidemic, and cerebro-spinal fever played an insignificant part in the future history of the New Zealand Division.

Towards the end of February venereal diseases became very prevalent: from 50 to 70 cases a week being admitted to hospital; at the same time the field ambulances were treating an unusually large number of cases of scabies, a disease unknown in Anzac. The relationship between these two diseases it not sufficiently appreciated. So far no energetic measures of prophylaxis had been adopted but in March instructions, emanating from the D.G.M.S. in France, led to a regular weekly venereal inspection

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of the troops of the Division carried out by the R.M.O.'s Brigade; cleansing tents were also provided, where men returning to camp could report for a prophylatic toilet which consisted of washing with antiseptics, an injection of 2 per cent. protargol, to be retained for some minutes, and a final application of calomel ointment, As there was reason to believe that the public brothels of Ismalia were not sufficiently closely supervised, a medical officer of the New Zealand Division undertook this unpleasant duty. Aided by an assistant, bacteriological methods were exactly applied in the inspection of the licensed prostitutes with the resulting elimination of microscopically infected women. In this work the mobile laboratory gave valued assistance as did the local Medical Officer of Health whose duties of inspection and certification did not, by law, include bacteriological examination. A lock hospital, at Suez, provided skilled treatment for the isolated women. In the month of March the wastage by venereal disease was 149 cases for the Division: a rate between 9 and 10 per thousand. The A.D.M.S. pointed out in a memorandum addressed to commanding officers the clear necessity for co-operation by lectures, instructions and a rigorous adherence to the disciplinary measures indicated, with united efforts of the senior officers as well as the medical staff. The results of these sanitary precautions were fairly satisfactory. The total sickness wastage fell to 12 per thousand per week during March. From this time onwards the percentage of evacuations by sickness by units of the Division was published weekly in routine orders: a very useful procedure, as it attracted the attention of commanding officers to the importance of maintaining the health of the troops and it engendered a rivalry between battalions which was educative and stimulating.

The interior economy of units was a matter which was receiving sanitary consideration. A canteen committee was established to ensure control, sanitary and economic, over the camp bazaar and institutes. All mineral waters were subjected to rigorous examination, and factories not complying with the regulations enforced by the Division were put out of bounds to the canteen purveyors. The R.M.O.'s who inspected daily were authorised to condemn eatables that appeared undesirable or were of poor quality. All mugs used for draught beer were to be washed in Condy's fluid— C.S.M. precautions—and cooked meat or eggs were to be served on pieces of bread laid on clean sheets of paper in order to avoid the risk of eating from badly washed plates. The kitchens of the units were closely supervised and

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native servants were excluded; food was to be protected against flies and sand by gauze wire screens; covered refuse tins were installed and emptied twice daily by the sanitary contractor; standing orders were posted in a conspicuous place in each kitchen setting out the usual sanitary recommendations. The cooking also was supervised and special memoranda issued on the importance of securing variety and palatability in the food, and on the special methods of treating the rations so as to provide wholesome and attractive meals.—the underlying principle being that if a man is well fed on palatable food in his own mess he is less likely to seek edible and potable refreshments in ineligible places; and that adequate nutrition is a check on alcoholism.

In March a part of the Sanitary Advisory Committee, a member of which had inspected the old Division at Anzac, visited the camp at Moascar. Lieut.-Cols. Balfour, Hunter and Buchanan reported on the sanitary conditions existing; a part of their report reads as follows:—"We found that the sanitary requirements were receiving careful attention, the work going on included the substitution of deep pit latrines revetted with sand bags and covered with flyproof boxes, for a defective open seat and bucket system with incineration of faeces. The change of system will not only be beneficial as regards conveyance of infection by flies and dust but it will do away with the nuisance which frequently arises from acrid smoke, and should diminish the use of native labour about the camp, and the special risk of infectious disease which the presence of these labourers entail. The incinerators are mostly of open type, often broken and are not well adapted to burning bucket contents, especially if the native labour used for the purpose is unsatisfactory." The decision of the Sanitary Committee strengthened the hands of the Anzac troops who were strongly opposed to the system in use when they took over the camp, that is: open latrines on the bucket system and incineration of faeces in the camp incinerators. The objections to this system were these:—The latrines were not fly proof. Incineration of faeces was very difficult to carry out except in specially constructed incinerators. Of these special incinerators there was not a sufficiency in the camps. Skilled labour was difficult to obtain amongst the Egyptians and finally, the process was so repugnant to Colonial troops that it could not be efficiently carried out by them. In this connection it is interesting to recall a system of individual incineration devised by the No. 1 New Zealand Stationary Hospital while in Salonika, and first suggested by Surgeon-General McPherson. The principle involved was one of segregation of liquid from solid excreta and

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immediate incineration conducted in person by the user of the latrine. The method consisted of so adjusting the two parts of a kerosene tin, divided perpendicularly by shears as to form two receptacles united each to the other by an extremity so that each inclined away from the point at which they touched; two inclined planes with retaining walls were so formed, one anterior to the other. A liberal sheet of paper was so adjusted in the posterior receptacle as to collect the solids, the liquid passing into the forward compartment. The paper and its contents were to be deposited by the user in a small incinerator controlled by a sanitary detail, constantly on duty within the latrine area. The urine of course was carried away by pipes to a soak pit. Very little training accustomed the users to this novel type of latrine which had every good quality to recommend it, but was more adapted to a small, well disciplined unit such as a hospital than to the ordinary needs of a camp population. Segregation afterwards became the rule in France, and incineration unquestionably is the council of perfection which was practised in all the large camps in England and in New Zealand. The deep trench system was recommended by the Sanitary Committee but it had been adopted by the Anzac troops as the most satisfactory solution of the incineration difficulties, in spite of the fact that the innovation was not well favoured by the local sanitary authorities. The trenches were dug 9 x 2 feet deep in interior dimensions which were not to be encroached upon by the sandbags used for revetment. In some instances, where the sand was usually loose, the walls needed staying by cross beams. Substantial fly proof seats were supplied by the Public Works Department of Egypt, and one trench was sufficient for a company for say six weeks to two months. This type of latrine is figured in Lelean's Sanitation" 2nd edition, page 251. In all these important preventative measures the New Zealand medical officers had much valuable guidance and help from Major Lelan, C.B., R.A.M.C., and Capt. F. Rose, R.A.M.C. of the 46th Sanitary Section at Ismailia, whose demonstrations of sanitary models were extraordinarily instructive. Capt. Austin, R.A.M.C., entomolygist to the Britism Museum, advised on matters apertaining to entomology, the chief being fly prevention. Flies were noted to be emerging from hibernated pupae in old manure dumps early in February, and by the 20th were increasing. In March they were fairly numerous about the camps. The main difficulty was the disposal of horse manure. A general routine order dated March 15th gave instructions that fresh manure from horse lines was to be taken to a site three quarters of a mile to leeward of the camp, there spread

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out to dry and subsequently burnt. A small tram line was constructed to carry out this order, but the process of burning not proving satisfactory, burial was resorted to. The native labour employed by the sanitary contractors:—"Compagnie du transport des Vidanges du Caire," was never satisfactory. The chief profit in the contract lay in the refuse handling,—it is questionable whether the company even handled the refuse to the best advantage as much of it was wasted. Remains of bread and meat were apparently extracted from the refuse heaps and sold in the Bazaar. A good deal of valuable fat producing waste was not utilised. Much of this refuse was removed by barges on the Sweet Water Canal and dumped in the old dry Canal of the Ptolomies, at no great distance from the camp, where flies could breed in haste and we repent at leisure. Fly proof meat safes were attempted, as the Sanitary Committee did not consider it necessary to fly proof the kitchens; screening from wind, however, was considered very necessary for open kitchens, so as to prevent contamination by or admixture of sand with the food. To carry out these necessary sanitary precautions a good deal of material—timber, wire mesh gauze, matting and so forth—was required, but as was inevitable, the supply could not keep pace with the demand. Two important preventative measures demanded completion before the division sailed for France. One was inoculation with triple anti-typhoid vaccine, T.A.B., the other was lice disinfestation.

During the month of December there had been an increase in the number of typhoid and paratyphoid "A" and "B" cases, with an increase in cases of dysentery of baccillary type admitted to the New Zealand General Hospital. There was a parallel increase in cases diagnosed influenza or tonsilitis which, probably, should have been more correctly labelled P.U.O. As already noted the Sanitary Advisory Committee had commented on the marked incidence of enteric in New Zealanders accompanied by a very high mortality. Returns furnished by the New Zealand Record Office showed that up to the end of October, 1915, there had been 453 cases of enteric fever amongst the New Zealand troops, with a 20.5 per cent. mortality. The Advisory Committee recommended that all convalescent "enterics" (which included the paratyphoid cases) should be returned to their respective countries, the object to be gained being:—not isolation of potential carriers—but a longer period of convalescence. Against this decision Lt.-Col. Parkes, N.Z.M.C., had protested, as in many cases the diagnosis was clinical only and had not been confirmed bacteriologically: less than half the cases evacuated to New Zealand were bacteriologically diagnosed.

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Lt.-Col. Heaton Rhodes, the New Zealand Commissioner, interviewed both the P.D.M.S., Surgeon-General Babtie, V.C., and the Advisory Committee in December, 1915, on this matter, and he was advised that fresh cultures for preparing T.V. vaccine should be sent to New Zealand. In a subsequent interview with Lt.-Col. Parkes at the New Zealand General Hospital, the pathologist, Mr. Armitage, N.Z.M.C., expressed the opinion that the majority of the cases investigated indicated a paratyphoid infection, that in this condition T.V. was of no avail as a protective measure and that he saw no occasion to doubt the validity of the New Zealand inoculations. The records of the Pont de Koubbeh Hospital showed that during the past year 245 cases of enteric fever in New Zealanders had been admitted and that 55 remained, the death rate being only 5 per cent. in that particular unit. From November, 1915, onwards all bacteriological and serological examinations in "suspect enteric," cases were being carried out at a central laboratory in Cairo; the chief reason being to standardise results from all the hospitals. The total number of cases of enteric fever in hospitals in Cairo on the 24th December, 1915, was 612, of these 120 were of local origin, and 4 cases of enteric, 2 of paratyphoid, and 1 of dysentery were reported for the week as occurring in New Zealand troops. This report, which was dated in January, 1916, shows clearly that the word "ENTERIC" had then, its old meaning:—Typhoid fever. There was much confusion in terminology at the time: the term enteric was used to cover typhoid and paratyphoid infections. Results of the bacteriological tests and the agglutinations carried out at the central laboratory, owing to mixed infections, and various vaccinations giving cross agglutinations, became so unreliable that the tests were abandoned about this time by order of the D.M.S. Of 84 cases, New Zealand patients subjected to complete investigation during October, November, and December, 1915, the results showed that 60.7 per cent were indefinite; 4.7 per cent. of the cases were proved typhoid; 4.7 per cent. paratyphoid B; and 29.7 per cent. paratyphoid A. The typhoid cases came from Gallipoli as did the paratyphoid A; the paratyphoid B all came from local camps in Egypt. A circular memorandum entitled "The Bacteriological Examination of Cases of 'Enterica'" issued from the office of the P.D.M.S. in Egypt on 3rd February, 1916, showed that there was a very small proportion of true typhoid infection, and that the greatest proportion of cases were paratyphoid "A" in the Gallipoli cases. The whole controversy is so buried in obscurities of nomenclature and diagnosis as to be hardly worth while reviving, were it not for the fact that validity of the New Zealand immunisations had been

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publicly impugned by the Sanitary Commissioners. A report written, when the mists had cleared a little in 1916, by Major Bowerbank, N.Z.M.C., officer in charge of the Medical Division of the N.Z.G.H. offers a stout defence of the New Zealand position in this dispute. He says: 'I have no hesitation in saying that the premises on which the opinion was formed were incorrect and the conclusions unjust, as the figures given by the Sanitary Commissioners referred to the 'enterica' group, not to typhoid alone.'' He goes on to show that his view of the matter is based on a close investigation of 303 consecutive cases examined with the assistance of Captain Armitage, N.Z.M.C., bacteriologist to the N.Z.G.H. in which all bacteriological and serological methods, then available, were applied with the following results: ''The great majority of the 303 cases investigated at the N.Z.G.H. proved to be paratyphoid, and against this disease neither the New Zealand nor the R.A.M.C. T.V. could afford any protection; but with regard to the typhoid cases, the figures indicate that, whatever may have been the protection afforded by the New Zealand vaccine, the R.A.M.C. vaccine afforded no appreciably better results;'' [in New Zealanders]. As in the investigation it emerged that: out of the proved typhoid cases a greater number had received both New Zealand and English vaccines than had been immunised with New Zealand T.V. alone; and the incidence of proven typhoid was no greater in New Zealand troops than in the British in Cairo at the same period.

By the recommendation of the Advisory Committee a supply of T.A.B. (triple vaccine against typhoid and the two paratyphoid ''A'' and ''B'' infections) had been indented for from the R.A.M.C. College in London. The vaccine arrived in February, 1916, and was used immediately to inoculate the incoming reinforcements. A triple vaccine was first used in the French Army in 1910, but in 1909 a similar vaccine was on the market in England, and was used to immunise civilians proceeding to India. The œther killed triple vaccine of Clovis Vincent was used by the Italians in 1912 during their war in Tripoli, but T.A.B. was not yet in general use in the British Army in France (see R.A.M.C. Journal, May, 1916). Inoculations were completed for all the division early in April: two injections were made, of .5 cc and 1.0 cc, at one week's interval, mainly in the pectoral region below the left clavicle. The reactions were brisk but not severe, so that only 20 per cent. of the troops were immunised on one day, allowing for one day's rest following the injection. The work was done at the field ambulances.

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The necessity of establishing a "delousing" plant for the New Zealand Division became apparent shortly after arrival in Egypt. The urgency of this consideration was indicated by a memorandum of the A.D.M.S. dated 7th February, 1916: of which the following is an extract: "Relapsing fever is now very prevalent in Ismailia. The mortality is fairly high and the drug required to treat it very difficult to procure [Salvarsan]. This disease is spread by lice infestation and the men of the division are largely infested. I wish to draw attention to the urgent necessity of forwarding the scheme for bathing and disinfesting of troops in the New Zealand and Australian Division." A scheme was in contemplation at Anzac which included hot shower baths and Serbian Barrell disinfectors in which the A.D.M.S. was much interested just prior to the evacuation. Some of the New Zealand troops had now been nearly 18 months in the field without any means of disinfestation, and relapsing fever was endemic in Egypt and at the time of the Moascar encampment there was a severe outbreak in the Egyptian Labour Corps at Ismailia. It was of the berberine type the invading organism being the *Spirochoete Berbera* carried by the body louse or the head louse. Another type of relapsing fever seen at Gallipoli was the Indian variety caused by the *Spirochoete* of Carter, a much milder type than the Egyptian disease. In the case of the berberine type of fever the body louse after feeding on the blood of an infected man remains inoccuous until the 5th day when it is capable of transmitting the disease up to the twentieth day. The *Spirochoete* is contained in the body fluid of the louse and may infect the minute wound caused by the bite when the parasite is crushed, as in scratching. Relapsing fever played a prominent part in the sanitary difficulties of the Balkan Campaign, of 1912-1913, when lice infestation became a cause of the spread of typhus fever. The association of these two diseases had previously been observed. It was mainly on account of the danger of bringing typhus to the Western Front that stringent orders were issued, at the instance of the French Command, to ensure that all troops from the East should be efficiently disinfested from lice prior to embarkation for France.

The New Zealand Division had initiated its own scheme prior to the issue of these orders in March but the water supply presented itself as a first difficulty. The Ismailia water purification plant was not able to keep pace with the demands of so many camps, as well as the pipe-line supply for the Suez Canal defence system to the east of the town. The town water works were of a very special type designed by Puech and Chaballe, French

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engineers; it dealt with the highly contaminated output of the Sweet Water Canal with an average bacterial content of 300 to 500 lactose fractors per c.c. Time was an element in the process of purification. Any attempt to increase the output would have been associated with deterioration of the quality. It was decided, therefore, to limit the supply to the camps and to install a new filtration system near Moascar for the purposes of military needs. As no water could be drawn from the Sweet Water Canal direct on account of the danger of bilharziosis, a general order had prohibited even bathing or washing in the Sweet Water Canal, owing to the fact that it was known to be infested with the *Cercaria* of *Bilharzia Haematobia*. In February the D.M.S., M.E.F., had published a circular memorandum on the subject founded on the work of Dr. Leiper, helminthologist to the London School of Tropical Medicine, which showed that endemic haematuria was exceedingly prevalent in Egypt—70 per cent. of the native population in Ismailia was infected—and further that the water of the Sweet Water Canal, its branches, marshes, pools and surface waters were more dangerous than well water owing to the fact that they harboured the intermediate hosts, two small snails, *Bullinus Contortus*, not unlike a very small winkle, and *Planorbis Boissyi*, a flat and very small snail shaped crustacean. The ova of *Bilharzia* after escaping from the human body per urethram or per ano, hatch out in water into free swimming *Miracidia;* the freshwater snails act as intermediate hosts, the larvae entering the snail's body, undergo further development into a opocyst which in turn produces innumerable *Cercariae*. The *Cercariae,* very minute, are free swimming, and gain entrance to the human body by penetrating the skin and mucous membranes. An infected mollusc may continue to discharge *Cercariae* for a period of three weeks. *Bullinus Contortus* was stated to be common in the marshes and ditches about Ismailia.*

The problem of making the water safe for bathing was a difficult one for the A.D.M.S.; our arrangements were explained to the Sanitary Commission whose opinion was invited. In their report they refer to the matter thus:—"We were shown a scheme for the combined washing and disinfesting establishment for the camp. Some fear was entertained of infection by the *Cercaria* of *Bilharzia*, as the water is to be drawn from a pit fed by the Sweet Water Canal. It seems possible to adjust the heating apparatus so that all water used is raised, if not to boiling point, at least to 70 or 80 degrees F. We think this should be made the rule. By so

* Dr. Leiper in 1919 informed the writer that a small water snail capable of acting as a host for the *Cercaria* exists in New Zealand.

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doing the addition of chloride of lime to the water before its use for washing can be dispensed with." After some investigation, the following determining factors were ascertained, all the result of Leiper's work in the Cairo Public Laboratory: An intake hard by a rushy bank or where there are weeds or vegetative growth must be avoided, as such growths hide the home of the water snail intermediate host of *cercaria*; as *cercaria* will pass through two feet of sand, an ample filter bed must be provided; a temperature of 150° F. kills *cercaria* instantly; but free chlorine, in the proportions used for water purification, will not kill *cercaria;* whereas one part in 50,000 of fresh chlorinated lime kills in three minutes, *cercaria* will live 1½ hours in 1 part to 300,000; the bisulphate water purification tablets are effectual as normally used in water bottles; and lastly cresol, at the rate of 1 ounce to 60 gallons or 1 in 10,000 kills almost immediately. In practice the dangers were obviated by digging soak pits some feet from the bank of the Abassia branch of the canal, so allowing for ample percolation through sand, at a site free from weeds or rushes. The water was pumped into a large tank of 1,500 gallons capacity, in which it was heated to 150 degrees F. and 1 in 10,000 cresol solution was added. The water was cooled in a cooling tank and was used at ablution benches by the men, for washing their underclothing and for the bath. All underclothing subsequently went into a steam disinfecting chamber where it remained 30 minutes. A 4 h.p. boiler achieved by the C.R.E., Lt.-Col. Pridham, R.E., was utilised for water heating and steam disinfection. The disinfection chamber 9 x 9 x 9, constructed with a wooden framework, walls of tarred paper, and a concrete floor, was used for steam disinfestation of the clothing; 30 minutes was allowed for each change, with packing and unpacking, say one hour in all. A team of natives were employed to disinfest the trousers and pantaloons by passing hot irons along the seams. The O.C. sanitary section so organised the work that a 1000 men could be bathed and disinfested in one day. The cost per man was a fraction over one halfpenny per treatment, this included soap which was issued. Our plant was supplemented by a locomotive disinfector sent to Moascar by the D.M.S., which consisted of an ordinary iron railway truck into which steam at a 100 lbs. pressure was admitted from the locomotive; 40 minutes sufficed, in the closed truck, to sterilise large quantities of clothing if suitably spread out. When made into bundles the sterilisation was not effectual; in several instances living lice were found in clothing so treated.

By March, 1915, New Zealand had despatched overseas over 31,000 troops, of these 10,000 were casualties: dead, missing, sick

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or wounded in hospital or invalided to New Zealand; 21,000 valid troops remained in Egypt. Over 122 officers, 1188 O.R., N.Z.M.C. had been despatched, of which: 55 officers, and 625 O.R. were now posted to the infantry division. Officers and men of the N.Z.M.C. had been through a special course of instruction, designed to prepare them for the Western Front. All danger of an invasion of Egypt from the Sinai Peninsula was now averted by the passing of the season of the early rains. In Mesopotamia, Kut was in the last days of its siege; our old comrades of the 13th Division pressing on to within 18 miles of the garrison, but held back by the Turks, also newly arrived from Gallipoli. At Salonika the eight allied divisions had not been able to render any material assistance to the Serbian Field Force now completely routed. A similar deadlock existed there so that all eyes were again turned to the Western Front. A general offensive by the Allies had been planned to take place in the early spring: Russia was to advance with her armies in the Bukovina, Italy in the Trentino; France and England, the latter now commanding a million men, were to blast out a way in the Champagne and on the Somme with a prodigious supply of ammunition. But Germany aware of all these preparations determined to forestall the attack by overwhelming the defences of Verdun under an avalanche of shells and threatening Paris with an army of 360,000 men advancing under a screen of artillery fire such as had never before been attempted. On the 21st February, the battle was engaged, the outer defences of Verdun had fallen, and by the end of March nearly a million of men had been cast into a bath of blood and fire undreamed of in previous wars; the French reserves were being used up, English troops perforce taking their place in the line, so postponing the Allied offensive. Russia, in order to help France, had launched a premature attack only to meet with defeat.

All available troops from Egypt were now being hurried to the Western Front: the 1st and 2nd Australian Divisions of the Anzac Corps, under General Birdwood, were the first to embark, the New Zealand Division following on their heels. General Godley was to remain behind for a while, the IInd Anzac Corps was still in course of formation. On the 3rd of April the Commander-in-Chief of the M.E.F., Sir Archibald Murray, K.C.B., K.C.M.G., accompanied by H.R.H. the Prince of Wales, inspected the New Zealand Division at war strength. The great review was a moving sight indeed to all New Zealanders: the proud march past of our 20,000 horse and foot, harness on back and high of hand eager to take their place in the Empire's ranks in Flanders—the preordained

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battle ground already dimly previsied in 1912 in the territorial camps of the Dominion. A new exodus from the land of Goschen.

By the 6th April embarkation commenced in three flights. The New Zealand Mounted Brigade, under General Chaytor, now forming part of the Anzac Mounted Division commanded by General Chauvel, A.I.F., remained in Egypt and with it the New Zealand Mounted Field Ambulance, under the command of Lt.-Col. Hand Newton, N.Z.M.C. The New Zealand Sanitary Hospital with 410 patients remained temporarily at Moascar. The O.C., Lt.-Col. McGavin, N.Z.M.C., had pressed a just claim for his unit to be converted to a C.C.S. for the service of the division, a provision contemplated by the New Zealand Government, but from a letter directed by the D.D.M.S. N.Z.E.F., to the D.D.M.S., L.O.C. dated 6th April, 1916, it would appear that it had been decided by the Imperial authorities that a New Zealand C.C.S. was unnecessary. Here was a most unfortunate misunderstanding. The stationary hospital possessed a fine surgical team which so far had not had much opportunity to develop its surgical ability. The cases treated at Moascar were mostly medical, one-third of them venereal disease. The conceptions of the functions of a C.C.S. were at this time, in the East, somewhat limited by local experience, *vide* the landing of the 1st Australian C.C.S. at Anzac prior to the landing of the bearer subdivisions. On the Western Front, stationary warfare had by now amplified the duties of the C.C.S., bringing it into line with the French Ambulance, or the German Feld Lazaret in the sense of bringing the surgical or operative treatment of wounds as close up to the firing line as possible. Early operation had soon proved its worth as opposed to the old South African policy of expectancy—any surgery that really mattered to the wounded man as regards the saving of life, was now the province of the C.C.S.—probably the most important medical unit in the field, and the pivot of manoeuvre in the evacuation of casualties.

By the 9th April, the third and last flight of the New Zealand Division had entrained for Alexandria. Divisional Headquarters reached Marseilles on the 11th. The passage through the Mediterranean was uneventful for the old Gallipoli transports again freigthing Anacs to further adventuers.

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CHAPTER VIII.

Armentières

On the 11th April, 1916, the first units of the New Zealand Division were disembarking at Marseilles, and, after an all too fleeting glimpse of the glowing colour of the Pays Lumière—then in full radiance of Spring—were hurried on by rail through Paris to the cold wet plain of Flanders, concentrating near Hazebrouck, about the 15th, in the Second Army reserve area. Divisional Headquarters were at Bleringhem, between Hazebrouck and Aire; here the A.D.M.S. established his office. Not far away on the road to Hazebrouck the 1st New Zealand Field Ambulance under Lt.-Col. E. O'Neil, D.S.O., opened its first tent sub-division, at the Chateau de Morbecque, on the site of a moated keep of the Flemish warrior, Dennis de Morbecque who had fought with Edward the IIIrd at Crecy, and whose tomb and effigy lay in the village church hard by. At the village of Tannay, Lt.-Col. Hardie Neil, N.Z.M.C., with the 3rd New Zealand Field Ambulance was in billets, his tent sub-division open in the school house at Thiennes, serving the 3rd Brigade, scattered through various farms and hamlets in the vicinity. The 2nd New Zealand Field Ambulance accompanying the 2nd Brigade had arrived later, on the 20th; Lt.-Col. Murray opened at Warne, close to Roquetoire the 2nd Brigade Headquarters. The Division was to be in reserve for a month; two divisions of the Corps, the 1st Australian and the 2nd Australian, were holding the line in front of Armentières and Sailly Sur la Lys. General Birdwood's Headquarters were at La Motte au Bois, on his staff, was the D.D.M.S., Col. Manifold, C.B., I.M.S.

The field ambulances were chiefly engaged, at first, in collecting their new transport and equipment. The transport waggons, horses, and mules, and the Ruston Mark 4 water carts were drawn from the Imperial Ordnance dépot at Abbéville, and were escorted to their respective units by transport officers and A.S.C. attached; the motor ambulances were not supplied until a little later. The new equipment, drawn from the supply depot of medical stores, included two water chlorination cabinets for each ambulance, designed for the purpose of estimating the amount of chlorination required to purify a given sample of

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water. The Divisional Sanitary Section was distributed in four squads whose duties were to maintain sanitary control over those parts of brigade areas which were not under military control, such as roadways, railway stations, brigade bathing and and disinfesting establishments, and to co-operate with the Divisional Engineers by giving expert advice and supplying plans and specifications for sanitary constructions.

The weather was very wet and cold when the troops arrived, so that an extra blanket was issued by Army authority to the Anzac troops who, coming from Egypt, felt the keenness of the northern spring more than the acclimatised British troops, now on their summer allowance of one blanket only. The New Zealanders, not yet accustomed to the rather ragged billets, in farm yards, barns, lofts and byres, found themselves, at first, rather uncomfortably housed in their novel surroundings. So far, they had no experiences of billet life. Some billets undoubtedly were better than others, but the majority of the farm buildings and out offices were by now dilapidated by the constant passage of troops, through the dearth of labour, and above all, of material. So that the farmers, who profited in revenue by billeting, were apathetic in maintaining their buildings, more especially as claims for compensation were also, at times, an added source of income. The whole question of billeting and requisitions had been legalised in France by the laws of the 3rd of July, 1877, and subsequent laws, and the right of billeting troops in France and Belgium had been accorded to the British Army. In England the powers of the annual Army Act provides authority for billeting troops, only, when the Territorial Force is embodied, in case of grave national emergency; but as France and Belgium have conscripted armies the billeting laws are permanently embodied in the Legislature. The procedure was briefly this:— On arrival in a Commune the billeting officer would, according to French law, apply to the Maire or the Adjoint au Maire (Deputy Mayor) through whom, alone, billets might be obtained. The requirements of units would be stated to the Maire who allotted the billets or cantonments from a list kept for this purpose at the Mairie. Billets de logement, or billeting orders were then issued to be presented by the incoming troops to the proprietors on taking over the cantonments. At the time of vacation the billeting officer handed the proprietor a billeting certificate signed by the O.C. of the unit showing the amount due, by which document the proprietor claimed payment at the Mairie. As a rule claims for dilapidation were settled by mutual agreement;

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occasionally they had to be referred to arbitration by the divisional claims officer who remained behind to adjust disputes. The legal tariff for billets in France was:—for an officer; one franc per night if supplied with a bed and linen; 20 centimes for N.C.O.'s supplied with a bed; and 1 sou per man in good closed billets.

Under the close billeting system in France, whereby a hundred men or more might be lodged in the outbuildings of a large farm—the lofts, barns, and byres being packed with men—stringent rules dealing with conservancy were very necessary. All refuse, including solid excreta was to be incinerated; where men were distributed over a wide area, the shallow trench latrines were permitted; but in closer aggregations a pail system with incineration, or deep fly-proof latrines, were required, where the subsoil permitted; where the subsoil water was in close proximity to the surface pails were necessary. The principle of segregation of liquid from solid excreta was compulsory where incineration—considered to be method of election—was practised. Much ingenuity and resource were required in devising conservancy appliances and the whole of the arrangements exacted a close supervision by regimental medical officers. Every effort was made by commanding officers to improve their billets and so provide for their men as to make the conditions of living as comfortable as possible. Needless to say the village estaminets became a perpetual source of pleasure and recreation to the Anzacs, always most welcome guests. Indeed the esteem in which the Anzacs were held by the French-Flemings, even from our earliest days in France was conspicuous. And it was not all cupboard love, indubitably there was also some natural love and affection between the parties. However that may be, the estaminet life—with all its faults—had something to recommend it from the point of view of morale—it kept the men amused.

The first anniversary of Anzac day was duly celebrated by the joyous announcement of the opening of the leave season to "Blighty." Many a young New Zealander was now to see "Home" for the first time; the leave allowed was eight days. The allotment to the ambulance personnel was 8 per week, but as the leave season was closed in June, some of the officers and men did not get away until after the Somme operations. The regimental medical personnel had their share of the battalion weekly allotments.

As the Division was ordered to take over the line in front of Armentières at an earlier date than anticipated, the 2nd and 3rd

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Brigade groups moved into the Anzac Reserve area about Estaires, where Divisional Headquarters were established by the 1st of May. In moving a Division very special precautions with regard to march routes and time tables are necessary so as to avoid dislocation of traffic. The Division moved in brigade groups. A brigade group for march purposes consisted of the Infantry Brigade, a company of Engineers, and a Field Ambulance, less the transport, which as a rule proceeded by other routes. New troops, with inadequate march discipline would no doubt straggle over a wide extent of road space, and during these marches a considerable number of men fell out owing to foot troubles. After the sand of the desert training ground the French paved road was an obdurate surface very damaging to the unhardened feet of the Infantry, the ambulances were temporarily crowded with march casualties in consequence. No. 3 New Zealand Field Ambulance opened in a convent school, "Notre Dame de Lourdes," in Estaires, where it found accommodation for 200 cases; No. 2 Field Ambulance established its Headquarters in an orchard near Doulieu in tents and huts as no buildings were available. The lack of motor transport was a serious handicap in these moves as the cars did not report until the end of the first week in May; some cars were lent, however, by the 22nd M.A.C. During the moves two cases of C.S.M. were notified in the 2nd Brigade, No. 2 Field Ambulance taking the 61 contacts concerned. It was a very strange phenomenon, this sporadic outbreak of C.S.M. during divisional moves, but it was observed from time to time; movement seemed to lead to casualties inevitably; apart from this the general health of the troops at this time was ever so much better than in Egypt, the sick rate being about 6 per 1000 per week.

In order to provide accommodation for soldiers who were not seriously ill but required a few days treatment, No. 1 Field Ambulance was instructed to open a divisional rest station at Chateau de Morbeque. Divisional rest stations had now become a recognised establishment on the Western Front, the idea was evolved from the earlier convalescent depots formed in the winter 1914-1915, at first as trench foot hospitals. The Austrian Staff Officer, Ritter von Hoen, whose manual, "The Strategical and Tactical Employment of the Medical Service," translated into English by Surgeon General Macpherson and published in 1909 as an official manual, possibly suggested the principle of keeping soldiers with minor disabilities, including slight wounds, within the Divisional or Corps Areas in a convalescent depot so as

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to avoid encumbering the lines of communication. Whatever the origin of the idea, it proved eminently practical and useful. It became the recognised work of a field ambulance in reserve to establish a D.R.S. for the reception of from 200 to 400 casualties of the type indicated; the average time for treatment was 10 days, after which the inmate if not fit, was evacuated to casualty clearing station, at which time his name was struck off the divisional strength.

The first medical unit to move into Armentières was the Divisional Sanitary Section who took over the duties of the 17th Divisional Sanitary Section and their quarters at the École Professionelle— the technical school at Armentières. By the 10th May, all moves were complete: at noon, the New Zealand Division had taken over its first sector of defence in France, with divisional headquarters in very handsome houses in the Rue Sadi Carnot, stated by the inhabitants to be the 5th Avenue, the Belgravia of the city. The houses were mostly modern, built in the Flemish style and must have been inhabited by wealthy manufacturers before the War. The A.D.M.S. established his office at the Civil Hospital which still harboured a few patients. No. 2 Field Ambulance relieved the 52nd Field Ambulance at the main dressing station, at a girls' school in the Rue de Messines, near the main road to Bailleul; their advanced dressing station was in a well preserved detached villa in the Rue des Jesuits in the Houplines area to the north-east of the town. The 3rd Field Ambulance took over from the 51st Field Ambulance with a main dressing station at the Cercle St. Joseph, a young men's club, just to the west of the new brick church of Notre Dame, while their advanced dressing station was situated in a brick kiln, on the high road to Lille at Chapelle d'Armentières, to the south side of the town. Each ambulance was serving its corresponding brigade.

The town of Armentières is situated on the right bank of the river Lys on the main road from the coast through Cassel, Baillieul, to Lille, of which city it was a busy, wealthy suburb. Very active and prosperous was Armentières before the war— with its linen bleach works strung out along the banks of the Lys, its thriving textile industry, its busy hum of spinning jennies and its many looms. The old fashioned weaver had a fine Flemish house in his factory grounds; the more modern built showy houses in the Rue Sadi Carnot. There was a good train service to Lille, distant by road, less than twenty minutes run in a car. The industrial centre round Houplines village to the north-east was of recent origin and formed a dense agglomeration of

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bleach works, linen spinning and weaving factories, sprouting like an asparagus bed with tall brick chimneys, now mostly cold. On the outskirts, spreading towards Lille, rows of workmen's cottages, two storied and rather drab; empty now, each bearing on its shattered roof or walls the seal of war. The old town had clustered about a venerable Gothic church, St. Vaast, dating from 1200, and grew with the progress of the linen industry, once almost a monopoly of the Flanders plain. The water of the Lys, owing to its chemical properties, some say its sewage content, was famous from early times for its bleaching powers and the linen yarn came from Ypres to be bleached there. Before this war Armentières had known war and had stood a siege during the days of Louis XIV.—but never a war like this. Early in September 1914, when it had a population of 27,000 the Germans advanced to occupy it; many of the poor people abandoned their homes, wheeling their chattels on pathetic barrows down the long pavé to Baillieul and beyond. But the French and British troops—the 6th Division—had retaken the place and the Germans fell back on prepared positions on the Perenchies ridge covering the Lille Forts. The bulk of the central part of the town was intact when we took over, and had a population of about 10,000, chiefly employed in the linen factories, which continued to work in spite of desultory bombardments. Owing to the proximity of Lille, which had a very large civil population, there were obvious objections to any advance on our part, and as Armentières was turning out a liberal amount of coarse linen fabric for the French Armies it was politic to avoid its destruction. Any unpleasantness on our part such as the shelling of Lille would have been requited by the bombardment of Armentières, and vice-versa, so that by a mute, but clearly understood compact between the opposing armies, Armentières became a quiet sector. The town had many advantages as it afforded superior billeting accommodation to over a Divisional strength. There was an excellent town water supply, the quasi-normal business, the flourishing shops, estaminets, cafés and restaurants and the large cheery French population made it a happy recreation ground for the troops coming back from the trenches only 4000 yards away; and the presence of so many young women and children so close to the front line was a powerful tonic to morale.

As a frontal attack on Lille was an impossibility for us, there could be no thought of an advance from the bridge head at Armentières: defensive tactics were dictated by the nature of the local military situation. The possibility of a German advance was

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evident; Armentières was in an awkward salient with the river at its back, a difficult place to get out of in a hurry as all traffic must pass through the town to reach the two standing bridges, one at Pont de Nieppe on the road to Baillieul and the other south of it, the railway bridge where the main line crossed the Lys—destroyed by the Germans in their retreat in 1914 but rebuilt by the French shortly after. The trenches were hardly 4,000 yards away from the centre of the town which was within easy range of enemy field guns; yet as a result of the tacit pact Armentières was little damaged, seemingly, in May, 1916. Houplines being much nearer the firing line had suffered a good deal and was certainly not a health resort; it still afforded some dingy billets to support troops, but was in places practically a part of the defensive position. Our front line lay with its left flank on the Lys to the north and ran southwards to the Lille road in front of Chapelle d'Armentières, where we touched the left flank of the 2nd Australian Division. The principle of defence in depth was observed by having a continuous front line trench held only in certain "localities" somewhat thinly with the minimum number of men so as to avoid casualties by shell fire. The intervals between the localities were very strongly wired and constantly patrolled. From the localities communication trenches zigzagged back to the support line also a continuous trench where the bulk of the front line garrison lived, and in between the two lines were strong points specially constructed to hold out against an invasion overwhelming the front line. Further in rear were the reserve positions in a second line of defence, somewhat similar to the first, duly interspersed with strong points, machine gun positions, and arresting entanglements. The front line system covered, say, 1200 yards in depth and was duplicated by similar trench systems further back supervised by the divisional reserves who were billeted in the vicinity. Two brigades held the line: the 2nd Brigade, in the Houplines sector, the 3rd Brigade south of it. The defensive scheme included a very detailed plan of action in case of an irresistible attack and a retirement behind the line of the Lys.

A very important defensive measure was being closely scrutinised at this time: protection against poison gas—gas defensive measures. The type of attack to be expected was by cloud gas discharged from cylinders in favourable wind conditions; the gas shell had not yet come into use. There had been just recently an attack on the First Army by a discharge of chlorine gas; the mixture of phosgene with chlorine in 50 per cent. pro-

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portion, the most deadly form of cloud attack, had not yet been devised but the new P.H. tube helmet, a cowl with talc goggles and an expiratory tube, was dressed with hexamine and was proof against phosgene. Several objections to this type of helmet were manifest. In the "alert" position it had to be worn pinned to the front of the tunic and tucked inside the breast; so that in the warm weather the jacket could not be removed as it carried the helmet, and the collar of the coat was an essential part of the apparatus as it was necessary to button it closely about the open end of the helmet, which needed careful tucking in so as to exclude gas. A further serious objection was the fact that the moisture of the brow bringing the chemicals of the fabric into solution produced irritation or burns—due to the phenyl compound—if the helmet had to be worn for any length of time. On the 17th June the enemy released gas on the Wulverghem sector to our north over an area of 3,500 yards. The Division there had 24 per cent. casualties with a high mortality rate mainly due to imperfections in the P.H. helmets. One of the minor horrors of the contraption was that it was a most unpleasant damp sticky thing to carry about, being hygroscopic it soon gathered moisture which loaded the pouch container; by seepage the phenyl-hexamine compound oozed on to the jacket making the hands most unpleasantly sticky and the garment disreputable.

A system of gas-proofing dugouts was devised by adjusting blankets to double doors so as to make the chamber tight against gas. Gas-proof chambers were installed in the advanced dressing stations: in use, the screens were saturated with hypo. solution by means of Vermorel sprayers kept for the purpose; as the doors of the gas proofs were double and gas tight, men could enter or leave the shelter obviating the admission of gas by using the neutralising spray in the air lock. Part of the work of the division was the pushing on with the construction of gas proof dugouts or cellars for the protection of the reserves or for the accommodation of wounded.

During the month of June there were several alarms of gas probably due to the lack of experience of our own troops; but some of the alarms originated in the German lines. The "gas alarm" was given by means of sirens worked by compressed air known as "Strombos" horns, the beating of improvised gongs, such as a length of railway iron, or by firing coloured rockets from the trenches; church bells in the vicinity were tolled to warn the civilians; the whole dismal chorus of sound very dis-

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quieting—especially as these alarms took place mainly at night. So real was the menace from cloud gas, so heavy were the casualties, that schools of instruction in the use of gas fighting appliances had been for some time established. Each division was to have a special gas officer and a party of N.C.O.'s all trained at the Army School by chemical advisers in order to instruct the division in the use of the appliances; a divisional gas school was part of the trench warfare school of each division. Shortly after our arrival in France applications for the post of Gas Officer were called for, ultimately Captain G. Borrie, N.Z.M.C., was appointed. Against this mis-appropriation of a medical officer both the A.D.M.S. and later the D.M.S. protested, as they considered that a medical officer could not be spared for this work which should have been entrusted to a combatant officer; but Captain Borrie proved so efficient an instructor that Army refused to release him.

The protection of the wounded from gas was provided for by allotting extra smoke helmets to the ambulances whose personnel and gas N.C.O. were well trained in the use of the appliances. The treatment of gassed cases consisted in the administration of ammonia from special glass capsules carried by the stretcher bearers; vomiting was encouraged by the use of emetics of salt and water; all gassed cases were to be evacuated from the cloud area as speedily as possible and on stretchers as lying cases. The treatment at the main dressing stations consisted of:—exposure to fresh air, oxygen inhalation and the use of small doses of morphia. The late effects; acute bronchitis, and broncho-pneumonia, were specially feared and were very frequently fatal; hydrœmia of the lung with intense cyanosis, not relieved by oxygen, preceded the end; atropine seemed to have little effect in controlling this condition of suffocation.

The medical scheme of evacuations of wounded from the trench systems required a considerable amount of careful consideration and organisation. Each A.D.M.S. in taking over such a system drafted his own scheme based on existing regulations, sometimes amending them as needs indicated, but generally in this stationary type of warfare there was little left to individual initiative, the various posts and routes of evacuation being permanent and part of the local defensive scheme. The medical arrangements always included provision for a retirement and the evacuation of wounded in conditions of a severe and sustained attack. At Armentières custom and military needs had already prescribed certain stereotyped routes of evacuation. In each of the two sectors the method varied but slightly.

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The old village of Houplines proper was on the road to Commines and distant about two miles from the centre of Armentières. It had a village church of some antiquity and a modern Mairie, situated at the south and north poles of the village respectively and connected by a straggling street of small houses in a dilapidated condition from shell fire, and abandoned by the civilians. Our front line trenches were 1200 yards to the east of the village, and the neighbouring village of Frelinghem, only a mile and a half away to the north on the Warneton–Commines road, was well inside German territory. Two regimental aid posts were accommodated in houses at Houplines. One of these was in the basement of an old estaminet, of which the front part, facing the enemy, was much damaged. The ground fell sharply to the river from the road level so that the back part of the house gave on to a garden some 10 or 12 feet below the roadway. The bank afforded some protection to the basement rooms. There was a kitchen with a cooking range, and two other rooms gas-proofed by means of doors and blankets. One was used as a dressing room, the other as a living room for the R.M.O. The situation was pleasant enough—on a quiet day—the garden and the river offered an agreeable outlook; there were meadows beyond the river and much to atone for the brutal ugliness of the broken village above,—at least it seemed a haven of rest for the wounded man from the trenches. The regimental bearers would have bound him up, placed him on a stretcher and carried him down the communicating trench and the avenue shoulder high, till they reached the mouth of the sap by the road into Houplines—a long carry of 1200 yards—over treacherous duck walks and round many an awkward corner where there was barely room to get the stretcher to pass. Down a sloping path from the street into the garden there was access to the R.A.P. and here the Medical Officer readjusted the dressings, gave what aid he could, morphia if required, entered the particulars of the casualty and tagged him with a special tally—red for serious cases—white for less serious. A wheeled stretcher in charge of one of the bearers of the field ambulance carried the wounded man as far as the Advanced Dressing Station, three-quarters of a mile away, along the main road to Armentières. It was not safe to bring a car into Houplines in daylight on account of its proximity to the firing line; at night it would have been very dangerous because of the shell holes in the road and enemy machine gun fire. Cars very rarely went into this village during the latter part of our stay in the sector. The advanced dressing

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station was in a substantial detached villa in the Rue des Jesuits, many ruined houses on each side abandoned by the civilians excepting a few refugees from Houplines or Frélinghem, living like rats in the cellars—women and children, too, amongst them. The A.D.S. had good cellars, well gas-proofed and a pump which yielded abundant water of fair quality. The ground floor provided a large dressing room and living rooms for the medical staff; there was the usual garden at the back giving on the river—a beautiful garden once, now grown to wilderness—the whole scene flanked by a forest of red brick chimney stacks. Less than half a mile away were two other R.A.P.'s of this sub-sector, both accommodated in a street of small modern cottages much damaged by shell fire. One of these R.A.P. had a steel cupola inside the best bedroom and sandbagged dug outs for wounded and staff in case of heavy shelling. The distance to the trenches was over 1000 yards along the communication trench. The R.A.P.'s were served by wheeled stretchers from the A.D.S. At the front door of the A.D.S. in the double gated drive a motor ambulance car was always in waiting. Any further attention required by the casualty was given at the A.D.S.; and a short run by motor ambulance through narrow streets, past the old church of St. Vaast completed the journey to the main dressing station at the Rue de Messines.

The Right Sub-sector had a somewhat similar chain of evacuations. The R.A.P.'s here were in dugouts in the trenches, generally behind the front line or in proximity to Battalion Headquarters. Wounded were carried down the communicating trench to the R.A.P. by the regimental stretcher bearers; in places where it was difficult to handle the ordinary pattern stretcher, a short trench stretcher came into use. From the R.A.P. the wounded were taken down to the support line, thence across the fields to the Lille Road where they were met by wheeled stretchers sent forward by the advanced dressing station party. One of the A.D.S.'s was in a brick kiln, the other on the main road in a ruined brewery where there were solid cellars and gas proof accommodation. Cars could come up by daylight unobserved to the brewery, about a mile and a half from the main dressing station at Armentières, through desolate ruined streets, often encumbered with the debris of fallen houses.

The difficulties of this chain of evacuations would have been enormously increased in the case of severe fighting, owing to the fact that the routes lay through narrow streets which rapidly became impassable if there was much heavy shelling. Alternative

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routes had to be provided and "avoiding" roads used under these circumstances. Special instructions were issued for the collection of wounded in case of a serious general engagement: a collecting post was to be formed for all lightly wounded, who would be directed there by special sign posts or medical orderlies detailed for the purpose: bearers from the Field Ambulances were to reinforce the A.D.S.'s and at once establish touch with the R.A.P.'s. On the Houplines side an alternative route of evacuation for stretcher cases was defined to run along the tow path of the canal as far as the Abbatoirs so as to avoid the narrow Rue des Jesuits in case of barrage. Special cellars and gas-proofs were provided in factories adjacent to the A.D.S. if evacuation became temporarily impossible. On the right sector the ruins of the lunatic asylum were to be used as a collecting point for wounded. There was less difficulty here as there was open country to the south and an emergency road could be used leading on to the Erquinghem Pavè so avoiding the town.

We have seen that there were two main dressing stations, one at the north end in the Rue de Messines on the main road to the bridge at Nieppe, the other, at the south end near the Notre Dame Church. Lieut.-Col. Murray at the Rue de Messines had to take over a small scabies hospital and baths for the treatment of that condition; on the ground floor of the girls' school two dressing rooms were established and a holding ward for wounded. A motor ambulance convoy—22nd M.A.C.—collected wounded and sick from the main dressing stations at a stated hour daily, but urgent cases such as abdominal injuries were sent away by special car at the earliest possible moment. A separate car was used for the transfer of infectious cases despatched to a special hospital or other unit designated for the appropriate type of disease. The general arrangements for the evacuation of sick were very complicated and required close supervision both as regards authorised form of diagnosis and destination. Prisoners of war were treated as our own wounded and were evacuated to C.C.S., if stretcher cases. They were to be searched by the Medical Officer in charge, all documents being retained, and notification was required by the Headquarters of the Division in order that interrogation by a staff officer could, if the condition of the wounded men permitted, be carried out at the M.D.S. The walking wounded prisoners were handed over to the Assistant Provost Marshal; no military escort was required for stretcher cases.

At the Cercle St. Joseph, Lieut.-Col. Hardie Neil had a very complete operating theatre established under the supervision of

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Major A. Martin, N.Z.M.C. The appliances had been brought over from New Zealand and had been donated to the Rifle Brigade Field Ambulance prior to embarkation. It was thought feasible, at this time, by Major Martin that adequate surgery could be carried out by a field ambulance close to the line—circumstances did at times permit of this and a certain amount of major surgery was performed at our ambulance main dressing stations throughout the war. The Cercle St. Joseph was equipped with beds and head charts and with its white painted theatre and glittering canisters gave some impression of a modern hospital. Its appearance was the subject of most flattering remarks by the D.M.S. of the Second Army, Surgeon General R. Porter, A.M.S., who with the D.D.M.S. of first Anzac, Col. Manifold, I.M.S., and Sir Anthony Bowlby, Consulting Surgeon, to the Second Army, visited and inspected the New Zealand Ambulances shortly after their arrival at Armentières. Colonel Manifold forwarded the following memorandum on the 27th of May. "The D.M.S., 2nd Army, desires me to communicate, through you to the O.'sC. and all ranks of the Field Ambulances in your Division, which he inspected to-day, the great satisfaction he experienced in noting the excellence of the arrangements which had been attained by them in so brief a time. General Porter recognises that this could have been secured only by every one putting their back into the work with a zest of which he cannot speak too highly after seeing the results."

Of the general methods adopted for the treatment of the wounded at this time a full account was given in the memorandum "Treatment of Injured in War," published by the War Office in 1915 and which was now in the hands of all medical officers. The principal points emphasised were these: where amputation was necessary in a field ambulance, patients should be retained after operation for at least 24 hours; haemorrhage was to be arrested by ligature, the use of the tourniquet was condemned, as it had been proved that infection by gas forming organisms was very liable to occur in tissues in which the circulation had been obstructed; abdominal wounds were to be sent on by special car for immediate operation at C.C.S., wounds of the back, loin or buttock with abdominal pain were to be treated as abdominal wounds—they were frequently penetrating wounds of the abdomen; penetrating wounds of the chest were to be plugged and sealed by strapping at the field ambulances so as to close them hermetically; suture of any type of wound was prohibited.

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The Divisional Sanitary Section had taken over a very big job of work: no less than a leading part in the municipalisation of Armentières. With the decrease in population, due to the frontier condition of the town, and the destruction of Houplines and consequent cessation of work in the factories there, the municipal life of Armentières was at a low ebb. A town Major appointed by the British Army was responsible for the allocation of billets and the administration of the "civil" life of the military population which outnumbered the civilian by two to one. With the loss of the electric power which had been provided by Lille prior to the war, street cars ceased to run; there was no electric lighting; and shelling had caused a cessation of street cleaning and road maintenance. The municipal water supply had been taken over by the British Army and was controlled by our Engineers; on that score there was little cause for anxiety save that the pumping plant was liable to be put out of action by shell fire. Alternative plants were provided and maintained in view of this eventuality. The Abbatoirs had been converted to the use of a detention compound; sanitary and veterinary inspections had ceased; the civil hospital was closed with the exception of a casualty ward. The Maire drove in daily in his car from Hazebrouck and functioned in a portion of the civil hospital where a few clerks and civil guards kept up a semblance of municipal administration; the Town Hall and Mairie were no longer inhabited except by the military police. The Division in occupation filled the place of the municipality, providing police, fire brigade, street cleaning, water supply and sanitary work where required. The sanitation of the city was handed over to the army authorities, who by the Divisional Sanitary Sections administered a variety of matters concerned therewith. There was a signed agreement made with the Municipality of Armentières, ratified in turn by Divisions occupying the town, that for the sum of 40 francs a day the "army" would sweep and clean the streets and squares and remove mud from the main drains by all means at their disposal; but in the case of a withdrawal of troops the Army would no longer be responsible to the municipality for these services. An extraordinary document, surely, as in order to carry out this contract it became necessary to employ a very large amount of personnel, mainly bearers of the field ambulances not otherwise engaged, or later, rose measles contacts who were allegedly in quarantine. Horse teams and drivers were used to work the mechanical road sweeping brushes or to draw the dust carts.

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Renewals of the large roller brushes were very difficult to obtain as there was no authority to purchase; the matter was arranged by a system of hire and compensation for damage, i.e.: renewal of the brushes by medium of the Divisional Claims Department. Dust carts were hired from a civilian contractor. Several large brick incinerators were erected at the Sanitary Section's refuse dump, where all garbage, stable manure and refuse from the streets was destroyed. The Horsefall destructors, previously installed, were found to be unsuitable for the incineration of stable manure, while brick incinerators of "bee hive" shape with long chimneys were found to be more suitable. During the month of May no less than 25 tons of refuse, daily swept up from the streets and billets, were incinerated by our destructor plant. During the month of June, 1,200 tons of refuse were dealt with and the equivalent of 100 miles of street swept and cleaned.

The town water supply was ample and of excellent quality, it was drawn from a deep well sunk to 300 feet close to the canal. The Siemens de Frise method of purification by aeration and ozonisation which existed before the war, and which was both modern and efficient, could not be used by us as the plant had been badly damaged by shell fire, but as the bacterial content of the water varied between 3 to the c.c. at the Power-house and 15 to the c.c. at the outermost reticulations, and *B. Coli* was never present, there could be no doubts as to purity. As chlorination was an army order it was enforced in the Division and all carts filling at stand pipes in the town received the regulation 30 grammes of bleaching powder, producing 1 part in a million of free chlorine. Constant watch was kept on all regimental water carts by the Sanitary Section and surprise samples of their contents were taken at intervals for bacteriological examination by the 5th Canadian Mobile Laboratory of which Colonel Nasmyth, C.A.M.C. was the chief and Captain Ellis, C.A.M.C., the second in command. Both these Canadian officers helped the New Zealand Division to their utmost, and the well known laboratory at Baillieul furnished bacteriological reports on the town water supply every week, at least, while the New Zealand Division was acting as the municipal health authority. This frequent examination was considered necessary as the supply was intermittent. Furthermore, adequate supervision of the regimental water carts by other authorities than the R.M.O. were enjoined by Second Army Orders issued by the D.M.S. It had been found that in many instances surprise visits made to regimental carts showed that chlorination was not being

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sufficiently provided for, but the sanitary authorities of the New Zealand Division did not consider the test quite a fair one as water which had been chlorinated some hours previously might not show any chlorine content by using the Horrocks' testing cabinet at the time when the sample was examined. Bacteriological tests were considered much more satisfactory. Colonel Nasmyth himself, the originator of commercial chlorination of water supplies at Ontario, was sympathetic to this requirement of the New Zealand Division as, the bacterial content of the town supply being known, bacteriological examination of the water provided by a given cart was the fairest test of the work of the N.Z.M.C. attached to its service. Reports from the laboratory revealed an extraordinary diversity in the flora of various samples: of five water carts sampled in July, three had evidently not been chlorinated; of these, one contained 14,000 organisms to the c.c.; another 2,500, with *B. Coli.* present; and the third 3,600 bacteria to the c.c. Of the two chlorinated carts, one showed five organisms to the c.c., the other a virgin water. As regards water supplies in general the Second Army had provided regulations which now applied to the Corps and were communicated to the Division in due course. Shallow wells were the main source of supply outside the Armentières town area. The water, which was obtained from a stratum of sand underlying the surface clay, found at no great depth—say 10 to 17 feet—was never safe to drink without previous chlorination or boiling. In the summer months, owing to the very large number of troops using them the shallow wells tended to run dry. In order to conserve and protect supplies a sub-committee was formed in each divisional area consisting of one R.E. and one medical officer whose work was to be co-ordinated by a Corps Water Board. The water supplies for troops in the firing line were to be provided by wells some 500 yards apart with pipe lines where possible to take the water direct to the trenches by pumping. In all brigade areas the Brigadier was to organise "water patrols" to conserve and supervise all wells, ponds and other sources of water. In most cases the source of supply was closely inspected—wells with pumps in use especially—the bacterial content was examined and a large wooden notice board was attached to the well showing its quality, whether fit for drinking or for washing only, and bearing in large characters the number of scoops of bleaching powder required for chlorination. The Divisional Water Sub-Committee was engaged in locating wells suitable for the supply of the trench line. In connection with the trench water supplies

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the A.D.M.S. issued instructions to R.M.O.'s whereby they were required to furnish a weekly report, giving the map reference of their water supplies and a certificate that all necessary regulations as regards water purification had been complied with.

One of the most important sanitary considerations was the supervision of the divisional baths and laundry and disinfesting plant established at Pont de Nieppe in a disused bleach works on the banks of the Lys facing Armentières and just north of the bridge. For the use of the bleach works the British Army paid a rental, and the plant was very suitable for the purposes both of baths and laundry: the huge vats used pre war for bleaching linen yarn with Eau de Javel, the substantial hydraulic presses and the copious supply of hot water from the large boilers were appliances adequate to all purposes. The Pont de Nieppe baths were well known on the English front as the first large institution of the kind to be established—by the 6th Division who were quartered in Armentières in the winter of 1914-1915. The large vats made surprising tubs for the men to bathe in; the hydro-extractors, rotary driers, the hydraulic presses and the extensive drying rooms, all used in the linen industry, were quite suited to the purposes of a laundry, so that several of these "blanchisseries" became operable as laundries at various points on the Lys in 1915. A large personnel partly military, partly civilian was employed at Pont de Nieppe: 1 officer, 2 sergeants and 65 O.R. N.Z.M.C. were supplied by No. 1 New Zealand Field Ambulance; the washing, ironing and mending staff comprised 185 women under a forewoman; the general control and direction was the duty of the Medical Officer in charge. Roughly, some 1200 men could bathe, be disinfested, and have their washing done in one day. Apart from the comfort which the hot bath provided the chief object in view was disinfestation of the clothing, which was attained by ironing with hot irons and brushing with special steel brushes—in the case of the outer clothing—the women being instructed in the method of searching for and destroying the lice ova, mainly hidden in the inner seams of the trousers or pantaloons. The under clothing was subjected to boiling in disinfectants, washed, dried and subsequently repaired. The wool of condemned socks was unravelled and used by highly expert darners in the mending of those that could be made serviceable.

Pediculosis—infestation by lice—had now become almost universal in the British Armies and presented a very real and constant menace of typhus fever, a disease known to be lice-borne and which had already devastated the Serbian and Austrian

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troops in 1915. The condition had existed since the inception of the war, introduced probably with recruits from the slums of the great cities, undetected in the somewhat perfunctory inspections of the early days of 1914, and allowed to attain to a degree of general infestation by propinquity during the heavy fighting of late '14 and the long period of dreary trench warfare under miserable winter conditions in early '15. Pediculosis was found to be present even in the New Zealand Reinforcements arriving from Egypt at the Base at Étaples in May, June and July, 1916. A lack of knowledge of the life history and breeding habits of the parasite was the cause of much hasty and ill advised instruction addressed to prevention (see Shipley's "Minor Horrors of War"). Every effort was being made in 1916 to push on with the anti-louse campaign now directed by the best entomolygists and scientists in England; notably, Bacot of the Lister Institute who devoted his life to this work and ultimately was to give his life in the cause. Shortly after the arrival of the Division the Entomolygist of the Second Army, then L-Sgt. Peacock, R.A.M.C., (T), late professor of Zoology at Durham University, was sent to advise us as regards pediculosis. The expert found from the examination of 110 shirts belonging to men of a New Zealand Battalion, just out of the trenches, that the degree of infestation averaged 3 per shirt and varied between 0 and 25; the pest was therefore under control, and the preventive measures in use should suffice to maintain this fortunate condition. Men had been frequently found on the western front to be infested to the degree of having many hundreds of living lice on their garments: a shirt handed in to our laundry in May was estimated to harbour 10,253 eggs besides 10,438 living lice. This shirt of Nessus was duly framed and shown with pardonable pride by the Medical Officer in charge of the baths to visiting Brigadiers who were visibly impressed. It was to such horrible examples, men who were by long use not susceptible to irritation from the bites and who were grossly careless of their personal cleanliness, that the plague was spread. As two cases of relapsing fever in New Zealanders had been reported shortly after our arrival in France, the Second Army was insistent in urging complete disinfestation of the Division.

The work done by the baths in the last fortnight of May was considerable: 446 officers, 21,675 men bathed; 13,779 shirts and 13,746 pairs of socks washed, with a corresponding tally of underclothing; the total number of pieces washed; 99,066. The consumption of coal was from 30 to 35 tons a week; soap 1½ tons;

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soda 1 ton; buttons, 200 gross. In the month of June, 36,483 bathers attended the baths, the average daily number of bathers was 1,300; nearly a quarter of a million pieces were washed. Besides these special bathing establishments the municipal swimming baths were reopened by us and used during June and July, Medical details taking over the management, and aquatic sports were organised in August.

It seems almost incredible that one duty performed by the Sanitary Section should have been an anti-malarial campaign; yet such was the case, malaria was endemic about Nieppe. The fevers of the low countries, known in the days of Marlborough, were in part malaria, which wrecked a British Expeditionary Force in 1807 on the Island of Walchern, and still persisted in the Lys Valley. There were known carriers in the Nieppe area where cases occurred annually. The larvae of *Anopheles* were first identified by us in July, all pools and ditches where they were found were duly oiled. One case of malaria was notified as occurring in a soldier of one of the field ambulances.

Control of the licensed brothels and filles publiques did not come officially under our sanitary authority, but was administered by the civilians—a local doctor carrying out the bi-weekly inspections; our police, however, kept a watchful eye on the matter. Infected women were segregated, and treated at our special hospital until removed by the tardy operations of the French Army authorities. Our venereal incidence was not high; infections mainly originated in England during leave.

Shortly after the arrival of the Division in France the long marches on the pavé roads brought to light a great deal of foot trouble and in the case of some Battalions the numbers of men falling out through lameness was considered very discreditable. It appeared clear that commanding officers were not carrying out the usual and necessary foot inspections and that there was a need of closer attention in this matter. The Division had no trained chiropodists although every Battalion in the Regular Army had specially trained men and came into the field with a Battalion Chiropodist and a regulation box of instruments. This matter had not been overlooked in New Zealand, as at the time of the 8th Reinforcements a professional was employed at Trentham Camp in training Army Chiropodists and pouches of instruments were given to such of the pupils as had qualified. One of these, a sergeant, at the instance of the Brigadier, who recognised the value of the work, had been appointed a whole-time chiropodist to the 2nd Brigade and partly in consequence of the

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representations made by the Brigadier it was decided to open a school of chiropody so as to train one chiropodist for each Battalion. Capt. Neil Guthrie, M.C., N.Z.M.C., of the 3rd Field Ambulance was selected to act as instructor with Sergt. Seymour, referred to above, as assistant. The chemical laboratory at the technical school was available; men were sent from each battalion to the school, the course lasting the prescribed three weeks as laid down by King's Regulations. In all, 18 men attended the school, where an attempt was made by the officer in charge to impart elementary principles of antisepsis and surgical cleanliness, in the first instance, and some elementary knowledge of the various deformities of the feet that lead to bad marching, and the modification in the boot necessary to relieve such conditions as flat foot, metalarsalgia and other deformities. Associated with the school was a boot mending and cobbling establishment and a clinic at which some 400 cases were treated and which afforded ample teaching material. 14 out of the 18 candidates satisfied the examiner; at the end of the course they were provided with the regulation pattern chiropodist's box of instruments, returned to their Battalions and did some good work during the marches to the Somme. The school emphasised the importance of regular foot inspections and the duty of company officers in caring for their men's feet. The art of chiropody as taught in the New Zealand Divisional schools was not purely a matter of first aid to blisters corns and ingrowing toe nails, it was, in reality, an elementary knowledge of the orthopoedics of the foot—and as such a peculiarly interesting study. In a future mobilisation the provision of trained chiropodists should be considered if excessive march casualties are to be avoided: the importance of the matter is well recognised in all armies.

A Dental Hospital was established in May at 42 Rue Nationale under the control of Lieut.-Col. Murray of the No. 2 Field Ambulance and in charge of Captain Tymons, N.Z.M.C., Senior Dental Officer, with two other officers, at which prosthetic work only was executed. All cases requiring mechanical work were drafted there by the dental officers working at the field ambulances who attended to extractions, fillings and other dental operations, the mechanics being transferred with the vulcanising and other required apparatus to the Dental Hospital. But at No. 1 Field Ambulance in charge of the Divisional Rest Station, the Dental Section remained intact so that all classes of work surgical, prophylatic and prosthetic could be performed there. Every effort was being made by medical officers to put the teeth of the

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Division into a satisfactory condition. Tooth and nail was now to be the order of the day; in every way possible—physical, mental and medical—the Division was being prepared to take its place in the great Somme Offensive.

Early in the spring of 1916, there had been a very marked increase of activity along the whole of the British front which now extended from Boesinghe on the Yser to Curlu on the Somme. The 10th French Army had been withdrawn into the General French Reserve by reason of the Verdun Battle which still raged in June, and British troops had replaced it in the trenches of the Loos-Arras sector. Some 40 British Divisions, with abundant ammunition were, as the summer advanced, becoming more and more active in demonstrating, by raids, cutting out expeditions, bombardments and aggressive tactics against the opposing trenches. The policy was in part directed to reanimating a combative spirit in the troops long tied to stagnant warfare and to train them for future offensive operations. The New Zealand Division, when it took its place in the line, was committed to this general scheme of local fightfulness, an important and essential prelude to the larger operations. Therefore, the quiet of the Armentières sector was to be rudely disturbed; our orders were to continue the raiding policy without giving the enemy any rest whatever, and to give back shell for shell—retaliation heaped upon retaliation—to which purpose our artillery found itself supplied with undreamed of stores of ammunition. The busy trench fighting and aggressive tactics of the Anzac troops may have seemed at times a useless waste of life, and activity ill applied, especially to those who lived in luxurious billets in Armentières, but it was all part of a concerted scheme, calculated to complete the training of the New Armies, and served the purpose of pinning the enemy to his lines and preventing him from employing troops elsewhere. Germany was at the moment deeply committed to the Verdun operations which held out little prospect now of final victory, but the very opposition set up by the devoted patriotism of France was itself a loadstone that drew the Germans on to further lavish expenditure of lives squandered in what had now become a national obsession. By June, the battle was at its fiercest phase, and had lasted 130 days during which the enemy had advanced five miles. The great Russian drive in the Bukovina was now overwhelming the Austrians in Gallicia where, by June the 16th, Kaledin had advanced at least 50 miles, taking an incredible number of prisoners. To meet this invasion, German Divisions had to be withdrawn from France. But England was

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now ready with 70 Divisions, while the failures of the Central Powers, at Verdun, in the Trentino, and in Gallicia, had put them on the defensive. The Somme area had been well and secretly prepared with an overweaning mass of guns and ammunition, the opposing front lines mined with gigantic charges of amonal, and the bombardment flung upon the forefield on the 24th of June exceeded in violence and weight even the early bombardments of Verdun. There was the heaviest fighting on all fronts possible and the trench activity at Armentières a reflex of this universal turmoil. But the raids were grisly affairs: as severe a test of the skill, endurance, and fighting qualities of the troops as any greater venture in the world contest.

On the 16th June our first raid was made. In the evening a secret order to O.C. No. 2 Field Ambulance advised him to prepare to receive casualties at about 11 p.m.: extra bearers and stretchers were sent up to the Advanced Dressing Station. Our guns opened an intense bombardment at 11 p.m. our raiders with blackened hands and faces and carrying strange weapons entered the "breakwater" trench in front of Houplines at 11.35; little of importance was found except a few German dead, but identification was obtained. After midnight the Germans released gas on the 41st Division on our left, but, although the gas was felt at villages in our rear, the Division was not affected. By 2.30 a.m. all wounded were in: 4 officers, 14 O.R., including raiders. Everything was in readiness for their reception and immediate despatch to C.C.S. in our motor ambulances. Over a third of the wounds were head wounds caused by shrapnel; the majority were severe, all due to the counter bombardment on our trenches during the raid. On the 22nd the 2nd Australian Division raided, bringing retaliation on Armentières; one of the shells thrown into the town just missed the sick officers' ward in No. 3 Field Ambulance; a gas alarm helped to intensify the animation of the scene which, as usual, was at its brightest about midnight. On the 23rd we shelled Perenchies Church, the enemy replied by bombarding Houplines, wounding several civilians who were received by No. 2 Field Ambluance. Bombardments and retaliation continued until it became necessary to evacuate all sick from the No. 2 Field Ambulance: it was not considered safe to keep them there, as civilians were being killed and wounded in the immediate neighbourhood.

On 24th June, the No. 1 Field Ambulance marched into Armentières to relieve No. 3; they had marched the 19¾ miles from Morbecque, in 7½ hours marching time, with a halt of one hour a:

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7.30 p.m. included. The 3rd Field Ambulance starting after midnight completed the journey in 8½ hours, which included a halt of one hour. Four kilometres per hour was considered to be the average pace of field ambulances on long marches without transport, or say 2½ miles per hour including halts.

Raid succeeded raid until the end of June when a much greater activity became necessary, in consonance with the great Somme offensive, now fully engaged. By this time very few sick were being treated in the field ambulances, and the lightly wounded were evacuated as soon as dressed. On July the 1st No. 1 New Zealand Field Ambulance had a very narrow escape. a 5.9 inch naval gun opened fire on the big church of Notre Dame, the Main Dressing Station, being in the direct line of fire received nearly all the overs. The patients, fortunately few in number, were removed to cellars at both ends of the building. Much damage was done to the buildings and later, during the bombardment, it was found necessary to shift the patients from the east to the west cellar; this was safely accomplished in the intervals between shells. The "hospital" by now had six or seven shells into it—the roof had gone at one end and the whole place, including the operating theatre, was a litter of debris, plaster, wood and rafters—the end and side walls were breached. Luckily, there were very few patients; two main body sergeants, Campbell and Greenwood, who were on duty, helped the patients out of the wards and cellars so that through their efforts no casualties occurred. The No. 1 Field Ambulance took up fresh quarters in the Institute St. Jude, Rue Dennis Papin; our stock of churches was rapidly dwindling, they had to be content with the school chapel for the main dressing station; a small crypt below accommodated a few wounded, while the staff were billeted in the College dormitories. The same night 1st Wellington raided at the junction of the 24th and 50th Saxon Divisions; they lost their Adjutant, Captain McColl, killed and had 1 man killed, 8 wounded, and by 3 a.m. on the 2nd, 18 wounded of ours and 2 German wounded were received by No. 1 Field Ambulance. The following night the Wellington Regiment sent out a party of 4 officers, 104 O.R., which found no enemy in the trenches raided, but suffered heavy casualties: one officer, and 2 O.R. killed; 4 missing; 35 wounded. The town was shelled about midnight and by 2 a.m. on the 3rd, the wounded were coming into the M.D.S. of No. 2 Field Ambulance: they were wet through and covered with mud, which in many instances was plastered into their wounds; most of the injuries were severe due to bombs or machine gun fire at close quarters; when dressed and warmed up they were

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evacuated in our own cars to the C.C.S. at Baillieul. The motor ambulance convoy could be summoned if necessary at any time by telephone but in minor operations our own cars were sufficient to deal with the casualties if not in excess of the total car capacity, say 60 to 70 stretcher cases or double that number of sitters, if all our cars were utilised, each ambulance having five heavy cars, Siddley-Deasy, and two Ford cars. We had stirred the Saxons up pretty considerably, and at 10.30 p.m. on the night of the 3rd July, they opened a very heavy bombardment on our Epinette salient, copiously sprinkling the town with shells of calibre up to 21 cm., using some incendiary shells which caused fires in several quarters. During the confusion thus created, a party estimated at 30 German raiders attempted to enter our trenches in the wrecked salient. Many severe casualties were suffered by the civilian population early in the bombardment; they were received by the 1st Field Ambulance whose wounded were now sheltering in the prepared cellars. Towards the close of the bombardment a heavy shell exploded on the Headquarters of the 4th Battalion of the N.Z.R.B.: the house, a large substantial building, was completely wrecked; the second in command and the R.M.O., Captain Errol Guthrie, N.Z.M.C., were killed instantly.

In the trenches we had many casualties: a party in one of our bombing posts in front of the wire was missing; one wounded Saxon remained in our wrecked trenches. Both field ambulances were fully occupied, extra officers and bearers were sent up from each to assist in evacuating the wounded from the Epinette. The motor ambulance drivers did good work steering their cars through the town in the height of the bombardment, houses crashing to the ground in every street during the two hours the action covered. The new billets occupied by the 1st Field Ambulance were badly damaged by a heavy shell which just missed the flimsy chapel; many of our men were killed or injured in the town billets. By 1.30 a.m. on the 4th the wounded were coming down to both Main Dressing Stations; great difficulty was experienced in getting the stretcher cases out owing to blockage of the communication trenches by shell fire and the debris in the streets of the town which the cars had to avoid as best they could. Most of the wounds were severe, chiefly compound fractures of the arms or legs; there were several cases of men suffering from shell shock due to being half buried in the trenches. By 8 a.m. 72 wounded had been evacuated to C.C.S. by No. 2 Field Ambulance and No. 1 had dealt with a smaller number (32) as their sector was not affected. The casualties in the 1st Auckland Battalion who held the Epinette on the night of the

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3/4th were: killed, 35 O.R.: wounded, 3 officers, 60 O.R. with 4 missing.

Capt. Thomas Errol Guthrie, N.Z.M.C. the only son of Dr. Thomas Orr Guthrie, M.D. of Feilding, who graduated at Edinburgh in 1909, had been an officer in the special reserve R.A.M.C. Prior to the war he had practised at Feilding and was on the staff of the Palmerston North Hospital—a young surgeon of promise—he joined the Rifle Brigade Field Ambulance in New Zealand and went to his battalion shortly after arrival in France. His body was buried with military honours in the soldiers' cemetery in Armentières.

The 5th of July was a very quiet day: certain changes in our dispositions were taking place, we were assuming a wider front, relieving Australian troops on our right in preparation for what proved to be the most costly and disastrous raid attempted by the Anzacs in this sector. The Second Anzac Corps with General Godley in command had arrived at Baillieul early in June, having left Egypt with the 4th and 5th Australian Divisions. The New Zealand and 5th Australian Division were to form IInd Anzac Corps; the 4th Australian Division going to Ist Anzac. The D.D.M.S. of IInd Anzac was then Colonel Reuter Roth, A.M.C., and the D.A.D.M.S. Major Butler, D.S.O., a trusty R.M.O. at Anzac where he won his decoration. On the 5th of July the 2nd Australian Division was being relieved partly by New Zealanders; General Birdwood and Ist Anzac were going south to the Somme—we were now under command of General Godley. The 1st Field Ambulance took over the brewery on the Lille road of which mention has been made and which had good cellar accommodation. "C" Section of No. 3 Field Ambulance relieved the same Australian Unit at the M.D.S. at Erquinghem, some 2½ kilometres south of Armentières on the main road to Estaires, Bethune, and Arras. They took over the communal school which was provided with an "elephant" dugout inside one of the class rooms used as the dressing station, and an advanced dressing station at Bois Grenier. As our front, now held by three brigades, had been so much extended—from the Lys to Bois Grenier—it required three main dressing stations and five advanced dressing stations, and at the instance of the D.D.M.S. the New Zealand Divisional rest station was moved up to L'Estrade near Steenwerck. The No. 1 Field Ambulance found better quarters at the Maternité in rear of the civil hospital, using the Institute St. Jude for billeting the personnel; the Maternité had an operating theatre with tiled floor very suitable for a dressing room, and through this newly

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established station, some 120 wounded, all of Canterbury Regiment, passed on the night of the 8th of July, as the result of a very determined enemy raid at the "Mushroom." The work of evacuation was not completed until noon the following day.

The 14th and 15th Ambulances of the 5th Australian Division were settling down at Bac St. Maur, Fort Rompu, Sailly sur la Lys, and at Nouveau Monde, where they had established an officers' rest house,—a Corps unit. The 14th Australian Field Ambulance was at Sailly and their D.R.S., with ours, at L'Estrade. A very serious operation was in preparation by the 11th Corps on our right, a feint attack on the Aubers ridge south-west of Lille—a raid on unusual lines and in very considerable strength. The 5th Australians, on our immediate right, temporarily attached to the 11th Corps for the purpose, were to participate. As the operations of the 5th Australian Division were to be on a large scale—and the probable casualties estimated at 2,500—the D.D.M.S. IInd Anzac had requested the A.D.M.S. of the New Zealand Division to take over part of the line. The M.D.S. party at Erquinghem, under Major Neil Guthrie, M.C., was reinforced by 1 officer, 3 wheeled stretchers, and 1 motor cyclist of the 3rd Field Ambulance and by 1 bearer sub-division and 7 motor ambulance cars of the 61st Field Ambulance of the 20th Division, one Brigade of which was now under our command and was covering Fleurbaix. On the 18th the New Zealand bearer sub-divisions were relieved from the baths and the street cleaning squads and "A" section bearers of the 3rd Field Ambulance went to Erquinghem, one officer with a tent sub-division and 60 convalescents from the D.R.S. at L'Estrade took over the baths, so relieving the whole of the bearer personnel. Major Guthrie now had the strength of a full field ambulance; from his M.D.S. at Erquinghem he had established two advanced dressing stations: one at Bois Grenier for the New Zealand Rifle Brigade; one at Croix de Rome, Fleurbaix, for the 60th—also a rifle brigade—of the 20th Division; all his cars were parked at Waterlands in the vicinity of Erquinghem but across the Lys.

Meanwhile the activities of the New Zealand Division were to be increased: raids followed in rapid succession, gas, smoke and shells were floated or hurled towards the enemy's lines; he, not to be outdone in animosity returned in kind. There were heavy losses on both sides. A condition of quasi-open warfare culminated on the 19th at 6 p.m. when the 11th Corps with two divisions, the 5th Australian, and the 61st assaulted the Aubers Ridge, carrying out Sir Douglas Haig's intention—a threat to

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Lille. That night at Armentières a heavy bombardment was heard by us at about 8 p.m. Two raids of ours went out and a simultaneous raid was made by the enemy on our Rifle Brigade sector. There was hand to hand fighting. Our artillery co-operated vigorously by firing 12,000 rounds into enemy billets, communications and battery positions. A lively night on our front, but a disastrous one for the 5th Australians who, having penetrated the Bavarian front trenches, stuck to their gains and were left to bear the full violence of the German counter attacks. New troops, only partly trained but full of the Anzac spirit, they suffered casualties to the extent of over 5000 officers and men, of these 3,326 wounded—much of this possibly avoidable. At 2.30 a.m. on the 20th the New Zealand bearers, already warned to assist if required, moved out in their cars to help the 5th Australian Medical units. There was a very considerable congestion of wounded at Rouge de Bout opposite Sailly sur la Lys, and at 9 a.m. on the 20th there were many Australian wounded still in the trenches and out in no-mans'-land, so that further detachments were despatched by the 2nd New Zealand Field Ambulance under Captains Kemp and Crawford,, N.Z.M.C., who, with 40 bearers and complete field equipment went on by motor ambulances to La Croix Lescornex. Arriving there at 11 a.m. they proceeded to "Eaton Hall," which was an advanced dressing station and officers and bearers set to work clearing wounded from the trenches about La Cordonnerie. After a complete tour of the trenches in the sector at 5.30 p.m. they satisfied themselves that all wounded had been cleared. Half of our bearers remained and worked through the night, relieving the exhausted bearers of the Australian Ambulances. On the 21st a few wounded were still coming in from no-mans'-land in front of the 5th Australian Division.

In acknowledgment of our bearers' work the Corps D.D.M.S. sent the following commendatory message to New Zealand Divisional Headquarters: "The Corps Commander has expressed his admiration of the good work done by the A.D.M.S., officers and O.R. of the Medical Service of your Division in collecting and evacuating wounded on the 20th and 21st of July, 1916. Please convey this message to all medical personnel concerned; it gives me great pleasure to publish this high praise." The A.D.M.S. of the 5th Australian Division, Col. Hardy, A.M.C., wrote to Colonel Begg as follows:—"I cannot tell you how much I appreciate your assistance. Every man was working and a sudden call for aid made me feel desperate. Your help came at

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a moment when it was badly needed. How well your officers worked and so did the men. The C.O.'s were grateful and spoke about the way your units worked. With many thanks."

In spite of all this turmoil and bombardments, ever increasing in intensity, the soldier's round of social pleasures went on undisturbed. In June there was an Axeman's Carnival in the Forest of La Motte at which our Maori Pioneers triumphed over lumbermen from Canada, bushmen from Tasmania, and bucherons of France. The Division organised swimming sports at the baths in August and held a great horse show on the banks of the Lys over against Erquinghem. There was a picture theatre in the École Professionelle and an occasional concert party, both playing to crowded houses. Institutes and canteens were opened by the Y.M.C.A.; many shops remained where clothing, groceries and even luxuries could be obtained; restaurants, cafés and estaminets were daily and nightly crowded. Above all the many brave men and women of Armentières who remained, at work, or because of their work people, helped to cheer and entertain the soldier and make his life in the town pleasant. These hardy Flemings had a great love of home and a strong faith in the British soldier who would one day surely drive the enemy away and give peace to their beloved town—our people—we their Defenders, brothers of their own Poilus!—and to this day they speak well of the "Brav' Néo Zélandais"—they remember our doings and the little lads who sold their papers in the trenches are now themselves soldiers, and they, too, remember the days when Armentières was in the jaws of war. Of the dangers cheerfully faced by these industrious people, our records speak quite plainly. Their wounded were evacuated with our wounded: men, women and little children: in the month of July alone 397 men, 208 women and 78 children, the majority of these wounded by shell fire, were evacuated by our ambulances. A certain number died in our dressing stations, including one French soldier, on leave to his home at Le Bizet Francais—heavily shelled on the 8th of June. Of our own dead we recall how they lie in brotherly ranks marked by service crosses, hard by a factory where the girls were used to closing up their ranks when a shell fell and blotted out a spinning jenny and its workers.

But the Division was going south to test its mettle in the Somme battles. We were leaving Armentières for a while, our blue-eyed fair haired Saxon "cousins" across the border whom we had baited if not cowed—they were of the same stubborn breed—were also on their way south. We were to meet again. 2nd Auckland raided on the 12th of August finding the 11th Division of the 6th Reserve

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Corps in relief of the 24th Saxon Division who had previously faced us at Armentières. Every Division was having its share in the great fight and was withdrawn only when it had lost a third of its effectives. Orders were received on the 10th of August that the New Zealand Division would be relieved by the 51st, a Highland Territorial Division. The Rifle Brigade and the 2nd Field Ambulance were on the move by the 14th; the sick at the D.R.S. had been disposed of to C.C.S. The 1st Brigade with the 1st Field Ambulance moved the following day. The enemy shot the belfry from the Civil Hospital as we were leaving, and by the 18th the last of the Division, now 19,000 strong, cleared Armentières, entraining to the neighbourhood of their old concentration ground. The Headquarters billeted in the ancient chateau at Renescure, once the home of our stout old ally Dennis de Morbecque.

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CHAPTER IX.

The Somme, 1916.

The division moved by stages, partly by rail from St. Omer to Abbéville and partly by marches into the Fourth Army Reserve Area in the Somme Valley between Abbéville and Amiens, completing its concentration by the 22nd of August. Divisional Headquarters were at Hallencourt ten to twelve miles east of Abbéville. The division now had a strength of 18,525, and its first units, the N.Z.E. and the Pioneer Battalion, were moving into the forward area about Albert on the 25th.

The ambulances—which had moved with the brigade groups and were billeted in villages adjacent to their respective brigades—put their bearer subdivisions into training immediately after arrival: route marches, physical training and games were the principal exercises practised with the object of getting the men into hard condition for the arduous work to come. A high standard of physical fitness is required of ambulance bearers, whose work demands both strength and endurance, and for which they must be trained as infantrymen.

A large amount of extra equipment was at this time carried by all the ambulances including 150 stretchers instead of 76; 400 blankets; 1000 shell dressings, and other additional supplies. The material was more than the G.S. waggons could carry, so that some of the loads had to be distributed amongst the horse ambulances, of which each unit still had three. For this reason, partly, the dental sections, of which the division had six, were ordered to the base at this time, as it was found impossible to carry their equipment, equivalent to 4800 lbs in weight. Some enquiries were being made at this time by the D.G.M.S. in France as to the establishment of the New Zealand Dental Sections attached to the division: our field dental service had attracted some attention on account of its novelty and efficiency. In reply to enquiries from the D.M.S. Fourth Army, Colonel Begg expressed the opinion that the New Zealand Dental Sections were not satisfactory as field units on account of the weight of their equipment. At Armentieres three dental surgeons and twelve mechanics with the heavy equipment had been able to attend to all the dental needs

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of the division, over 19,000 strong, but he considered that the old arrangement of having a dental surgeon with light equipment weighing only 80 lbs. attached to each field ambulance was preferable. It might be held that despatching the dental surgeons —who after all were then officers of the N.Z.M.C.—to the base was not the best course to take as the heavy equipment could have been stored during the period of active operations and the services of the dental surgeons, which they were most anxious to give, would have been very valuable both at the A.D.S.'s and corps M.D.S.'s where their training would have fitted them to act as officers in a variety of useful employments not wholly medical. If a dental officer was competent to evacuate wounded at Anzac—why not at the Somme? Apparently the services of the dental surgeons were urgently required at the infantry base at Étaples.

Another important medical unit of ours was already established in the Somme area. The New Zealand Stationary Hospital, which had left Moascar shortly after the division, disembarked at Le Havre on the 13th June, under Lieut.-Col. McGavin with a strength of 12 officers; 126 O.R., with No. 10 Dental Section attached. After a short period of training at No. 1 Camp, and a course of gas defence instruction, the unit detached 7 officers and 83 O.R. under Major Acland, N.Z.M.C. to act as a C.C.S. in conjunction with No. 2 G.H. at Quai d'Escale, dealing with large numbers of casualties from the Somme which they tended and transferred to hospital ships. On the 10th of July, the O.C. and his Q.M. proceeded to Amiens where arrangements were made to relieve the 1/1st South Midland C.C.S. at the convent of the Sainte Famille and the Lycée a girls' school. The final moves of the stationary hospital were completed by the 13th when they took over from the outgoing unit: 11 officers, 88 O.R. patients; an X-Ray plant; equipment and accommodation for some 712 patients; the 12th Mobile Laboratory and the Fourth Army Ophthalmic Centre were also attached. The buildings which the New Zealand Hospital took over were historic. In the early days of the War No. 7 G.H. (R.A.M.C.) opened here, in Amiens, late in August, 1914, but on the approach of German patrols the hospital and all its equipment, including the X-Ray plant, had to be abandoned. The Germans entered Amiens, occupied it for 10 days, and utilised the hospital, but owing to the prevision of the Rev. Mother Superior Mᵉ Gaudin, most of the equipment was saved including the X-Ray plant, stated to have been hidden in the cellars. The British red cross flags were still flying when the French returned to the Cathedral City. The 1/1 South Mid-

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land C.C.S. took over the hospital in July, 1915, so that the original equipment of the 7th G.H. which had served the Regulars, the Germans, the French and the Territorials in turn now became available to the New Zealand unit. The headquarters of the Stationary Hospital were accommodated in the convent; no rent was charged by the good sisters who cheerfully made room for suitable quarters for the seriously wounded. The New Zealand Stationary Hospital became a C.C.S. under the D.M.S. of the Fourth Army and early in August took on strength 19 N.Z.A.N.S. sisters and staff nurses under A/Matron Price, so replacing the British sisters returned to other units. In August, 1297 sick, 97 wounded, were admitted and 274 sick and wounded remaining at the end of the month.

The New Zealand Division was now about to take part in the great battles; the marches up the Somme Valley commenced on the 2nd of September; Amiens was passed by easy stages and by the 9th the division was concentrating between Albert, Fricourt, and Becordel. The Allies' long premeditated campaign on the Somme, to be launched at our junction with the French Army in front of Peronne, was hastened by the necessity for relieving the pressure at Verdun.* There had been three phases in the fighting in July: during the first four days our attack south of the Ancre—which flowed southwards and westwards to the Somme dividing our line north of Albert—had been successful in penetrating the front line system to a depth of about 2 miles. The attack had been irresistible. The second phase opened on the National Fête of the Republic, the 14th of July. In this fighting the second line of German defences fell, with the exception of some points of great strength which still held out. On the ridge separating Albert from Bapaume there were four strong points: Ovilliers to the left of the road; Thiepval further west near the left bank of the Ancre; Pozières astride the summit where the straight Roman road to Bapaume crossed the ridge; and lastly the Highwood. The 1st Anzacs took part of Pozières on the 23rd of July—their first operation at the Somme—and after three days desperate fighting gained the whole position as far as the wind-mill on the highest point of the ridge. Part of Delville Wood and two-thirds of the Highwood were secured by other troops at a very heavy cost. This completed the third phase: the "mopping up" of the second line positions. The battle of Verdun had been materially affected by our successes south of the Ancre, German troops had to be with-

* Allied War Council at Paris, December 6th, 1915, decided this offiensive. The intention being to bring Italy, Russia, France and England into intimate and scientific co-operation. Haig Command, p. 66.

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drawn, the initiative was now passing into the hands of the French. The month of August saw a lot of gruelling work in clearing up isolated strong points; Thiepval, Mouquet Farm to the left, and part of the Highwood still held out; the present tactical need was to obtain complete control of the dominant ridge which overlooked the German third line position now visible from the high ground at Pozières.* The French were co-operating on our right, meeting with some success and assisting our movements towards Guillemont. The Anzacs made a further successful advance from Pozières and by the end of the month Delville Wood on our right was wholly ours after a battle lasting six weeks, the bloodiest affair in the whole campaign. There now remained only Guillemont on our right and part of the Highwood as obstacles to our advance to the third line positions. All through the month of August good news had reached the Allies and heartened the battlers at the Somme whose morale was at its highest when the New Zealand Division arrived. The Russians under Brussilov continued their compelling drive into the Bukovina, crossed the Carpathians, clearing the right flank of the Roumanian Army now pouring into Transylvania. The Italians had passed the Isonzo and entering Gorizia, advanced along the Carso inflicting sensible losses on the Austrians. Even sleepy Salonika had wakened up, General Seraihlé was bombarding Doiran and shortly would occupy it, so pinning the Bulgarian Armies to their ground, taking their German planned counter-attacks lightly from Kavalla to Florina where the new Serbian Army had now joined the ranks of his polyglot command. Good news everywhere—the Allies were at the top of their form—winning all along the line; even at Romani the Suez Canal defenders were defeating a Turkish raiding force and Anzac horsemen were scourging the remnants of the broken column.

With a high heart, the New Zealand Division took ground in the appointed positions on the 11th of September, relieving one brigade of the 55th Division and portion of 2nd Brigade B.E.F., by the 3rd (N.Z.R.) Brigade. Our division formed part of the XVth Corps. Our front covered about 800 yds.: the northern end of Highwood, a sea of shell holes pierced by jagged tree stumps, like masts of sunken ships, lay 1000 yards away to the left front; facing our line, some 300 yards distant, was the trench on the crest on which the 5th Bavarian Division were working actively by night, it ran into that portion of Highwood which they still defended: the village of Flers, more or less undamaged, was about

* This period marks the commencement of the battles of attrition and the abandonment of the strategical aims. Haig Command, page 120.

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2000 yards to our right front. Our right flank was level with the northern edge of Delville Wood, and some 300 yards from the Flers–Longueval road where we joined the 41st Division, also of the XVth Corps; our left flank faced Highwood; at this point the IIIrd Corps boundary touched that of the XVth. The 2nd New Zealand Brigade was in support with troops in Mametz Wood and Fricourt; the 1st Brigade at Fricourt. Divisional Headquarters were established in a small gravel pit on the main road, Albert to Bray sur Somme, about a mile and a quarter east of the Church of the Leaning Virgin in Albert. The field ambulances, still attached to their brigade groups, were in Fricourt or the reinforcement camp, on high ground south-west of Fricourt and overlooking it.

The medical arrangements which we are about to study were prearranged by the XVth Corps whose D.D.M.S., Colonel F. R. Newland, A.M.S., was to a certain extent guided by the D.M.S. Fourth Army, Surgeon General O'Keefe. The chief centres for evacuation of wounded were two stations: the corps main dressing station, and the corps collecting post, both situated at Bécordel, a ruined village about 2½ miles west of Albert on the road to Fricourt. The corps, being the fighting unit, remained in position the divisions that composed it were constantly renewed, they came and went; the Corps M.D.S. was a permanent establishment manned by the tent subdivisions of the various field ambulances that accompanied the divisions. The senior medical officer for the time being took command; the total personnel required was nine tent subdivisions. "B" Section tent subdivision of Nos. 1 and 2 Field Ambulances, and "C" Section tent subdivision of No. 3 Field Ambulance reported for duty to the Corps M.D.S. on the 12th, opening a New Zealand Section in the standing marquees provided, using their own equipment. No. 1 Field Ambulance less one tent subdivision, in conjunction with the 139th Field Ambulance of the 41st Division formed the personnel of the XVth Corps Collecting Post sited a little north of Bécordel on the main road Albert-Peronne, and adjacent to the C.M.D.S.; Lieut.-Col. E. O'Neil, D.S.O., N.Z.M.C., was in command. The function of the corps collecting post was to deal with all walking wounded, all sick, and the stragglers from the corps front; only a few tents and huts were available. Our Division had two advanced dressing stations, of which the chief was on the left rear of the divisional front at a place whose map name was Flat-iron Copse, from the fancied resemblance of the contour of the now vanished wood that once flanked a narrow country lane leading from Mametz to Bazentin le Grand. The A.D.S.

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consisted of a few splinter proofs built in the side of a quarry over some deep German dugouts, which gave a limited amount of cover to wounded and personnel. The route to Bécordel lay through Mametz and Fricourt, a distance somewhat over four miles. The successive advances, made in early September had much increased the distance between the advanced and main dressing stations, but no suitable position on a good road was as yet available for advancing the corps stations. Our chief line of communication was along a pavé road, originating in Albert, that led through Bécordel, Fricourt and Mametz to Montauban, where hard by the western corner of Bernafaix wood, the road to Longueval trending northwards, cut it at right angles. The distance from Montauban, which lay behind our right flank, to Bécordel was about four and a half miles. When we speak of the villages along this road, it would be more correct to say the sites of the villages because, by this time, little was left except a few brick heaps to mark the spot where once had been an aggregation of houses and farm buildings typical of this part of France, so unlike the Flemish plain where individual farm houses flanked the roads in a never broken continuity. Water supply, possibly, was the reason for this aggregation of farms, or in remote periods, mutual protection, the solid walls about the farm buildings making a species of fortress. Of this feature the enemy had availed themselves and of the deep cellars in the chalk, to convert the hamlets into strong points, hence the utter obliteration caused by our guns, and later by theirs. To the north of the brick heap that once was Montauban, there was a quarry approached by a sunken road in a small valley known as Caterpillar Valley. At the quarry an A.D.S. had been long established in dugouts made by the Germans: safe enough for them, but for us not so safe as the entrance to the shelters faced towards the enemy lines. Following the sunken road northwards across the Caterpillar Valley, one would arrive in time at two important trenches, part of the old German front line which we had taken, running east and west, one parallel to the other, Carlton and Savoy trenches, less than three-quarters of a mile in front of the quarry and on high ground from which a view of our front line, a little less than a mile ahead, could be obtained. It was a long carry from our front line to the Quarry A.D.S., and in order to break the journey a bearer relay post was established on a flat hillock near Carlton Trench called "Green Dump" where relays of field ambulance bearers took over from the incoming teams and completed the transit of stretcher cases to the Quarry where

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motor ambulance cars could approach down the sunken road at Montauban from their parking place, known as Motor Car Post, in the ruined village. Had we continued our journey along the track past Carlton trench where brigade headquarters were accommodated in deep German dugouts, we would have very soon reached another relay post on the road from Longueval to Bazentin called "Thistle Dump," which was at the mouth of the sap "Thistle Alley" leading up to our front line trenches, 1,200 yards distant at this point. To Thistle Dump the cars from the A.D.S. at Flat Iron Copse could penetrate in good weather along the road through Bazentin, the distance by road being nearly two miles. The journey for a wounded man was probably more expeditious *via* Thistle Alley to Thistle Dump and thence by car, than through the open to Green Dump and thence to the Quarry. The length of the hand carriage was less to Thistle Dump, say 2000 yards maximum, than *via* Green Dump to Montauban, say 3000 yards. but there was a tendency for wounded from our division to flow down from the right flank of the position by the latter route because the character of the country somewhat favoured that line as we shall see presently. So then, based on the Corps M.D.S. and Collecting Post, we have two advanced dressing stations: the "Quarry," 4½ miles away at Montauban fed by its bearer relay post, Green Dump, nominally evacuating the right of the line; and Flat Iron Copse, four miles away, evacuating the left of the line. Such were the tactical dispositions of the medical lines of evacuation just prior to the first engagement—the Battle of Flers.

The A.D.M.S.'s operation orders were issued on the 11th, and on the 14th a conference was held at which the ambulance commanders met the A.D.M.S. It was now decided that Lieut.-Col. Murray, N.Z.M.C. commanding the 2nd Field Ambulance should take charge of all forward evacuations from the A.D.S. at Flat Iron Copse; the bearers of the three field ambulances were put at his disposal with all the motor ambulance cars, 21 in number. The 41st Divisional Medical Units were to have the Quarry A.D.S. and Green Dump, and were responsible for evacuations from that sector which might include the extreme right of the New Zealand Division, so that all New Zealand personnel was withdrawn from these posts. Certain important administrative instructions, already issued to medical officers, were discussed in detail: the regimental aid posts were to be supplied before action was engaged with bearers from the ambulances to act as guides to the B.R.P. and to keep up communications. We

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have seen that each ambulance now carried a much increased number of stretchers and blankets, but in case of need a reserve of both these necessities was kept at the C.C.S. and could be made available to the officer in charge of forward evacuations on his requisition and would be brought up by advancing M.A.C. cars as far as M.D.S. or the Corps Collecting Post, whence they could reach the A.D.S. by the returning motor ambulance cars of the division. In the case of a demand for ambulance cars they could be furnished by the O.C. 27th M.A.C. but only on requisition by the A.D.M.S. as the M.A.C. was a corps unit. Two C.C.S.'s Nos. 36 and 38, stationed at Heilly five and a half miles away to the S.W. in the Ancre Valley, were to take in wounded alternately: a large notice board, situated at a point of vantage on the route and illuminated at night indicated to which C.C.S. the convoy should proceed.

The duties of the corps collecting post were mainly classification of all that mass of men lightly wounded, sick, gassed, suffering from shell shock, or hysterical conditions, or battle stragglers, not obviously unfit for service. A police posse, provided by the corps, was stationed at the post, where men not clearly disabled by injury or sickness—after a careful examination by a senior medical officer—were collected, the military police being charged with the duty of returning the stragglers to their unit; at the A.D.S. there was also a police posse with similar duties. A nominal roll of all stragglers handed over to the police was to be furnished daily to the A.D.M.S. Of the methods adopted to ensure adequate sorting of this mixed bag, we shall enquire more fully at a later period. In all these arrangements dictated by the D.D.M.S. at corps headquarters we see the first clear indications of the growing importance of the corps medical staff as a command and the massing of the ambulance resources to clear the corps front; each division was still responsible for its own forward evacuations but beyond this point the medical arrangements were now in the hands of the D.D.M.S. and there was to be an expansion of the corps control and some increase in the responsibilities of the D.D.M.S. as time went on—conditions resulting from the close order fighting of position warfare and the battle of limited objectives.

The battle about to be engaged, which we call the battle of Flers, was a very important operation destined to clear the flank of Combles so that the town might be pinched out rather than crushed out by our artillery fire, and was to comprise the united efforts of two British and one French Army. On the 13th,

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General Fayolle, commanding the French Army, on our right, in front of Peronne, had carried the village of Bouchavennes, to the south east, and it had been agreed by Generals Foch and Haig that Combles should not be directly attacked but should be "pinched out" by the two armies, each moving up to envelop it. The objective of the British battle was to clear the French flank by our advance to Les Boeufs and Morval. The operations were to be carried out by the whole of the Fourth Army and one corps of the Fifth Army, the Canadian Corps, which had relieved 1st Anzac about Pozières and Courcelette. The order of battle was: from left to right, the Canadians, a Scottish Division, Northumberland Territorials, the 47th London Territorial Division, the New Zealand Division, the 41st Division, the 44th Division, then came the XIVth Corps with the Guards Division on the left, a Regular Division came next, and on the right flank of the Fourth Army was a Territorial Division. The whole front covered some five to six miles and was manned by no less than ten divisions. John Buchan says:—"This was a battle of British *corps d'elite*"—and they were opposed by the best of German troops: the Prussian Guard facing the Canadians; some of the best of Bavarian Divisions facing the Fourth Army. For the enemy we had a terrible surprise in store: the heavy machine gun section, known as "Tanks," now to be used for the first time in the war. There was a chance that this new weapon might cause such disorder in the German ranks that when the third line positions were penetrated a break through might occur; for this eventuality a mass of cavalry was brought up and stood in readiness to work through to the rear of the Bapaume defences. Indeed there was every probability that the combined effort would result in a striking victory.

Facing the New Zealand Division were four important lines of trenches: the Crest trench, some 200 yards ahead of their assembly trenches, the Switch trench just in rear of it, the Flers system covering the village 1000 yards away, and the Gird system the last of the organised enemy lines covering the village of Gueudecourt, two kilometres from Flers. The village of Flers did not form a part of the New Zealand objectives, it and the road which approached it from Longueval was in the territory to be taken by the 41st Division on our right. Two battalions of our second brigade were to take the first objectives, the Crest and the Switch, the 3rd, (N.Z.R.) Brigade was to pass through in four waves of battalions to the further objectives. It is hardly necessary for us to recall the slow pulverising bombard-

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ment of the past three days which had theoretically reduced the German positions to a chaotic lunar landscape, nor of the rolling barrages under cover of which, and from the flame and smoke of which, our men were to spring with threatening bayonets upon the terrorised defenders—all this has been written.

OPERATION. AT FLERS, 15TH SEPTEMBER, 1916.

During the night the battle opened on our extreme left where the Fifth Army attacked and took the "Wunderwerck," a super strong point in the Hohenzollern line, so freeing the left flank of the Canadians and by 5 a.m. on the 15th the four tanks allotted to the New Zealand Division were moving out to show the way to the Infantry. The morning broke in perfect Autumn weather, a slight mist lying in the valleys, the two Battalions of the Second Brigade and the Rifle Brigade were waiting the signal in their assembly trenches. At 6.30 a.m. the engagement opened, the intensive bombardment, and the creeping barrage crashed out from thousands of guns of all calibres. The two New Zealand Battalions advancing in waves passed over the Crest trench without difficulty, later suffering considerable losses from machine guns in the Highwood, attained their objective beyond the Switch trench in 30 minutes and on time, but it was not until some hours later that they had completed the clearing out of desperately fighting fragments of the Bavarian Division who still clung to portions of the broken trench line. The Rifle Brigade was now pressing on to the second and third objectives.

At 6.45 a.m. the first of the walking wounded were filing into the bearer relay post at Thistle Dump, and were being directed on to the A.D.S. Stretcher cases coming down a little later were conveyed by wheeled stretchers or by horsed ambulances to Flat Iron Copse. The 2nd Otago Battalion had had heavy casualties, losing nearly half its effectives, and as their wounded began to come in, extra ambulance waggons were required at the A.D.S.

Before ten o'clock, the 3rd Battalion of the N.Z.R.B. had been held up by uncut wire in front of their sector of the Flers trench and a considerable accumulation of wounded was growing in a position in the rear of the right flank of the Division: the walking wounded coming straight back in line with the Flers-Longueval road to Green Dump had reported the matter. But just at this time the 41st Division had met also with opposition and heavy shell fire in or about the village of Flers, so that most the bearers of that division were withdrawn from Green Dump and moved forward to the south east of Flers. At 10.30 a.m. tanks came to the rescue of the 3rd Battalion of the Rifle

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Brigade, and with their assistance our line was able to advance; the 1st and 2nd Battalions were already moving to the final objective, north of Flers—practically the whole of the second objective was now in our hands.

Wounded, lying and walking, were coming freely through the A.D.S., Lieut.-Col. Murray had explored his front about this time, and found that as far as the Switch trench the ground was practically clear of wounded of the 2nd Brigade and the 2nd Battalion of the Rifle Brigade with whose R.M.O., Captain Brown, N.Z.M.C. he was in touch. Captain Duncan, N.Z.M.C., of the 2nd Canterbury Battalion was wounded and had been evacuated. Green Dump was reported not busy and the Quarry A.D.S. practically clear of wounded. By noon it was becoming clear that the wounded of the remaining battalions of the N.Z.R.B. were not coming down at all freely, although all were now in the third line of the attack, and our right flank was well out beyond Flers. The enemy had put down a barrage in front of the Switch trench on the crest which it was very dangerous for bearers to pass through. It was also known that these battalions had sustained substantial losses. The A.D.M.S. now directed the A.D.S. parties to push the bearers ahead as far as circumstances would permit in order to clear this flank. By 1 p.m. it became known that the R.M.O. of the 1st Battalion, N.Z.R.B., Captain Bogle, had established his R.A.P. earlier in the day at a point south-west of Flers, that there was some congestion of wounded at this post and that some of his cases were coming through Green Dump and the Quarry A.D.S. Up to 2.30 p.m. approximately 500 British and 120 New Zealand patients had passed through the corps collecting station, wounded mainly from the 2nd Otagos, the 4th, 2nd and 3rd Battalions of the N.Z.R.B. Captain Aitken, N.Z.M.C. was ordered to relieve Captain Duncan with the 2nd Canterburys. At about 3 in the afternoon the Flat Iron A.D.S. was heavily shelled—near 100 wounded were in or about the station at the time—some of our bearers were killed or wounded, and had it not been for the prompt action of Captain A. V. Short, N.Z.M.C., who rallied the bearers, and himself assisted in bringing the stretcher cases under cover, many more lives would have been lost.

By 5 p.m. the advance had ceased. Martinpuich and Courcelette had been carried by the Canadians and the Scottish Division on their right. Highwood had at last been cleared, but with grave losses to the 47th Division; the New Zealand and 41st Divisions were linked in a salient covering Flers, but Morval and Les

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Boeufs, which were so important to the French, held out, the Guards losing heavily. Some of the objectives had been attained, not all, we had broken through three lines of defence on an average depth of one mile. The 24 tanks co-operating had met with some success. It was determined to push on with the attack the following day.

It had appeared to Lieut.-Col. Murray that the evacuation of wounded was proceeding satisfactorily; at 5 p.m. he reported that everything was going well and that he had succeeded in getting extra stretchers and blankets up to the R.A.P.'s on his front. He was quite satisfied that the 1st and 2nd Rifle Battalions were evacuating through Green Dump and that the 41st Division were attending to that flank through the A.D.S. at the Quarry. At 6 p.m., however, there was considerable congestion of wounded at Flat Iron Copse, evacuations were delayed by the supplies coming up to the front line through the narrow road from Mametz practicable for wheeled traffic as far as Thistle Dump; the wounded of the 47th Division were coming in freely; our A.D.S. was shared by that Division as it was on the route from the eastern corner of Highwood, where the Londoners had sustained very severe losses, and where their line joined the left of our division. The wounded from our right flank evidently were finding their way in to the 41st area but a few wounded from Captain Bogle's R.A.P., not yet definitely located, were coming into Flat Iron Copse. As evening drew on the bearers of No. 2 New Zealand Field Ambulance were showing signs of great fatigue: the day's work had been heavy and the carries long—the work of evacuation much hampered by the barrage on the crest, through which the bearers must pass as the communication trenches were so badly damaged as to be unsuitable for the carriage of stretchers—all work beyond the crest trench had to be done in the open. There had been some casualties: one bearer killed, several wounded. Lieut.-Col. Murray now requested the A.D.M.S. to send fresh bearers and more ambulance cars, and shortly after, three bearer sub-divisions from No. 1 Field Ambulance under Captain Mitchell, N.Z.M.C., reported for duty, with three motor ambulance cars and three lorries. And by half-past seven p.m., the bearer subdivisions of "A" and "B" Sections of the 3rd Field Ambulance, under Major Martin, N.Z.M.C., had orders to move up to Flat Iron Copse.

Rations and water were, by 7 p.m., on their way up to the front line. In Flers some wells had been located and in many of the German dugouts, bottles of soda water had been found.

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Our water supply was carried up in petrol tins, it had been chlorinated in bulk in the battalion water carts. By 8 p.m. traffic was diminishing on the Mametz–Bazentin road, and the congestion of wounded at the A.D.S. was relieved. There was the usual call for extra stretchers at about 10 p.m., but as there was an ample reserve at Thistle Dump, and extra stretchers had already been sent forward to the R.A.P.'s it did not appear that there could be any serious shortage. By 11 p.m. the bearers of the 3rd Field Ambulance had relieved the bearers at Thistle Dump and Major Martin now took command there as forward evacuating officer.

Evidently there was something wrong with our right flank evacuations as a message reached Lieut.-Col. Murray through the A.D.M.S. at about 11.30 p.m. originating from the 3rd Brigade Headquarters It read:—"3rd Brigade report large numbers of wounded at R.A.P. Carlton trench and elsewhere." To which the A.D.M.S. added:—"Send officer to Brigade Headquarters to investigate. Ensure that close touch is kept with R.M.O.'s and that R.A.P.'s are kept clear." Now the 3rd Brigade Headquarters had moved early in the morning to the junction of "Fat" and "Flag," trenches just in front of the R.A.P. where Bogle was, and it is assumed, and seems probable, that the report sent in by the 3rd Brigade refers to Bogle's post and not to the R.A.P. at Carlton trench.

The night was fairly quiet in the trenches; by midnight corps orders arrived for the operations on the following day, which were timed to take place at 9 a.m. on the 16th: a resumption of the attack at Les Boeufs and Gueudecourt to enable the cavalry to get through. Our Division with the 41st and 44th, were to complete the capture of the objectives allotted to them for the 15th. Tanks again would lead the way: one of the reasons for causing the tanks to lead off before the infantry was that they might avoid wounded men lying on the ground in their track; it was necessary to attach three men to each tank on the 15th for the purpose of shifting the wounded. Fortunately the tanks were very slow, advancing only 15 yards a minute on badly shelled ground. During the night, no doubt in anticipation of a break through, all first line transport moved up to Green Dump including that of the 3rd New Zealand Field Ambulance.

After midnight wounded were coming down in large numbers to the corps main dressing station. The New Zealand Section were working in shifts in the marquees allotted to them. All wounded were receiving A.T.S. injections, the necessary dressings and

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splints were applied and such surgical interference was made as seemed urgently required. The patients were fed, warmed up and ultimately evacuated to the 36th and the 38th C.C.S., which had been cleared in anticipation. The D.D.M.S. earlier in the afternoon had visited the New Zealand Section and expressed satisfaction with the arrangements made.

Shortly after midnight confirmation of the block on our right flank came through from the "A" branch of the 41st Division who reported that large numbers of New Zealand wounded were coming through their A.D.S. at the Quarry, Montauban, and they asked that New Zealand bearers be sent forward to assist with the evacuations. Col. Begg, who was holding one section in reserve now instructed the O.C. No. 3 Field Ambulance to send his "C" section bearers to the Quarry and by 2,35 a.m. on the 16th, Captain G. Robertson, N.Z.M.C., commanding "C" section bearers, had moved out and the A.D.M.S. of the 41st Division was advised of this move. Touch had been established with the 3rd Battalion of the Rifle Brigade and through the night, bearers from Thistle Dump were clearing their area, and an officer had been sent to Carlton trench to investigate conditions there, but at 4.30 a.m. the Rifle Brigade Headquarters now returned to Carlton trench, wired to say that so far no officer had reported to them. Colonel Begg, when made aware of this, pointed out the difficulties of getting messages through by hand and the very long delay so incurred, as, for instance, his message to Lieut.-Col. Murray, timed 11.25 p.m. "send officer to Green Dump" the reply to which did not get to Colonel Begg until 2 a.m. It seemed to Colonel Begg that telephonic connection with the A.D.S. was eminently desirable as it would have saved much misunderstanding.

OPERATIONS ON 16TH SEPTEMBER, 1916.

The first New Zealand Brigade was entrusted with the task of completing the work of the division, and by 7 o'clock, the R.A.F. reported the Gird trench for which they were bound, to be not then occupied by the enemy. While yet in their assembly trenches the 1st Wellington Battalion met and repulsed a counter attack launched by the 6th Bavarian Division, and shortly after moved out to the assault of their objectives.

At 7.35 a.m. Lieut.-Col. Murray reported Carlton trench to be clear of wounded at 5 a.m. He had visited Thistle Alley which now became an advanced A.D.S. and had proceeded along the road to Longueval in order to ascertain if a better route

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of evacuation could be devised, but he found the whole road to be under observation and subject to shell fire. He had sent Captain A. V. Short, N.Z.M.C. to Carlton trench; no wounded were found there: he also despatched a message to the 3rd Brigade Headquarters indicating the location of the Thistle Dump, A.D.S., in case they had any difficulty in evacuating wounded through Carlton. In any case before this time, say at 5 a.m., the bearers of "C" section, 3rd Field Ambulance had reached Montauban. It is easily understood that the bearers moving from Mametz to Montauban would be much delayed. The intense congestion of traffic on the road led to prolonged blocks; there were repeated delays, movement was impeded and for very long periods at a time ceased altogether, so that the time expended in traversing a few miles often ran into as many hours. By instructions of the 41st Division Medical Officers the New Zealand bearer subdivision were employed at the "Shrine" a small post on the Longueval-Flers Road, where they were in touch with Green Dump. But Green Dump was not a well defined locality, and Carlton trench had considerable length; part of the troops were in the trenches, part above ground. We have also seen that all the first line transport of the division was moving out to Green Dump during the night. Movement through the eastern end of Caterpillar Valley was slow, the ground soft, and in places very muddy. The valley was packed with artillery of all calibres constantly in action; the noise was very confusing. All these factors tended to beget misunderstandings and delays.

By 10 a.m. a very clear account of the medical situation on the right flank came to headquarters from the 2nd Brigade, who reported that Captain Bogle, R.M.O. of the Ist Battalion of the N.Z.R.B. had 120 stretcher cases in an exposed position about 650 yards west of the south end of Flers, near some old German dugouts, the position now definitely located by a map reference. Something of this had already been reported by the 3rd Brigade at midnight, and again at 6 a.m., but owing to a misunderstanding, two officers sent to Carlton trench by Lieut.-Col. Murray did not report to 3rd Brigade Headquarters—not easily found, as they were in a deep dugout—but had reported to the 41st Divisional A.D.S. with the results already shown. Now bearers were asked for at a definite locality, the matter seemed clearer. The A.D.M.S. sent an officer to report to the 3rd Brigade Headquarters. This was done, and, promptly a small party of volunteers, mainly transport details, under Captain Grant, N.Z.M.C.—transport officer of the 3rd Field Ambulance, who had arrived at Green Dump—set out

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with guides for Bogle's post; sometime later, the "C" section bearers of No. 3 Field Ambulance were withdrawn from the 41st Divisional A.D.S. and were instructed to clear Bogle's Post as expeditiously as possible.

By midday wounded were coming in freely to the A.D.S. at Flat Iron Copse: serious cases—mostly compound fractures and severe head injuries; the wounded of the previous day had shown a preponderance of machine gun casualties. Owing to the heavy barrage on the trench on the Crest, the work of the bearers was difficult, dangerous and slow, the ground was very badly cut up; the bearers were suffering casualties. Thistle Alley, the communication trench, leading to the Crest was heavily shelled with H.E. and lachrymatory gas; a few shells containing what was deemed to be some other type of gas compelled the parties at the advanced A.D.S. to work in goggles and helmets for a time. By 1.30 p.m. stretcher cases were coming in from Bogle's Post to Thistle Dump, the A.S.C. party of No. 3 Field Ambulance having arrived. One of them acted as a guide for the bearers now sent forward from Thistle Dump. "though," as Lieut.-Col. Murray says in his diary, "evidently from the fact that the wounded of the 1st N.Z.R.B. were coming through [prior to this] our bearers were already in touch with this R.A.P." 50 details drawn from the reinforcements were now put at the disposal of Lieut.-Col. Murray as additional stretcher bearers to sweep the ground in front of and behind the most advanced R.A.P.'s.

Shortly after 2 o'clock, orders were issued cancelling all further movements of the 1st Brigade, the advance ceased; we did not attack the Gird system, but heavy trench fighting still persisted in attempts to clear a communication trench called Drop Alley, which marked our left flank, and which was still held by the Bavarians. By 3 o'clock the forward evacuating officer, Major Martin, had cleared most of the wounded from his front, but an impassable barrage had now fallen like a curtain on the Crest impeding the work of clearing Bogle's Post, which could not be resumed until the barrage lifted or until dusk. The Switch trench was very heavily shelled during this afternoon, all traffic had to pass over the spur of the main ridge, on which Crest trench and Switch trench were sited. The high ground was under observation by the Germans, our new communications were not as yet completed, the New Zealand Pioneers were engaged in the work of digging an avenue leading into our forward positions. The open ground over which the bearers had to carry was pitted by deep shell holes

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closely set, so that the going, even in dry weather was very slow: the carry was nearly 3000 yards from Bogle's Post, which was extremely exposed. By 5 p.m. Major Martin reported to Lt.-Col. Murray, that he was in close touch with all R.A.P.'s and that with the exception of about 100 stretcher cases at Bogle's Post, all were fairly clear. Captain Brown, N.Z.M.C., R.M.O. to 2nd N.Z.R.B., was brought in about this time wounded, Capt. McCormack, N.Z.M.C. of the No. 3 Field Ambulance relieved him, temporarily, and proceeded to his R.A.P. in a sunken road near the Flers trench.

We will now follow the advance of the 1st Brigade, this day accompanying the 1st Canterbury Medical detachment in the narrative of Capt. Johns, N.Z.M.C., the R.M.O. "The battalion got into action on a Saturday [September 16th], going through an enemy barrage which started as soon as we showed our noses over the crest of the hill. It was a perfect rain of shells, high explosives, which fortunately were very local in their effects and did not cause as many casualties as would have resulted had the Huns used shrapnel. They also turned machine guns on us as we got nearer the village. I followed the battalion up with the corporal medical orderly and my batman, and while we were patching up some of our wounded, we lost sight of the battalion. The ground was covered with dead and wounded New Zealanders and Germans, as our fellows of another brigade had attacked the previous day and cleared the Germans out of the village: we were supposed to be going up to relieve them. What between shell dodging and patching up wounded on the way, it was well on in the afternoon before we caught up with the battalion in Flers. The village was knocked to pieces. That night I got a sort of aid post fitted up near headquarters; our battalion had taken over trenches in advance of the village. We then had a good look round the village, nearly everyone was drinking soda water and smoking cigars, and had collected some sort of souvenir. I got into the German doctor's dugout where I found cigars galore and several things that I wanted—drugs and dressings, any amount. These dugouts are great places, dug in some cases down to 100 feet below the surface and made jolly comfortable and safe from artillery fire."

As darkness came the bearers of "C" section No. 3 Field Ambulance under Captain Robertson finally reached Bogle's Post from Green Dump. They lost two men killed and eight wounded going up. There was a very large number of wounded collected about this post. Captain Bogle at the time when the 3rd Battalion of the Rifle Brigade was hung up the previous day—his own battalion being the last—received a large number of wounded from

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the three battalions in front, the 3rd, 2nd, and Ist (his own) and was obliged to dress and tend these wounded where they had collected. Now it so happened that this locality, by reason of a small bank some 12 feet high and about 150 yards long running north and south, gave shelter from machine gun fire coming from the high ground on the left of our advance, and although the position looked out openly towards Flers, there was little fire coming from that direction, at least while the enemy were shifting their guns. There were a few dugouts in the bank, one of them had a sandbagged porch and had already been used by one of the German R.M.O.'s. Two trenches scored the bank at right angles, opening out on the post, both leading to Fish Alley, a name given by us beforehand, to the German communicating trench, which led from Flers trench to the Switch. Good cover for the Bavarians—as to the south, the ground rose sharply to the crest and there was protection under the bank from our fire coming from the south-westward—where our chief gun positions were—and as we have seen the hollow in which the post lay gave some protection to our own people. Here the wounded drifted or were carried all during the day and night of the 15th. Some of the walking wounded and a few stretcher cases found their way to Green Dump or Thistle Alley. The tendency for bearers or walking wounded would be to follow the direction of the Longueval–Flers road parallel to the bank, but some 600 yards away to the left of returning parties. The night of the 16th was extremely dark, most of the serious cases had been collected and were lying on stretchers about the post as there was not room enough in the dugouts to shelter them. As the 3rd Brigade was being relieved by the 1st Brigade, volunteers to carry stretchers were called for from the 2nd Battalion of the N.Z.R.B. now returning. All the wounded who were lying on stretchers were carried out, but many remained for want of more stretchers. While tending these wounded Captain Bogle was hit by a shell which burst immediately behind him, killing him instantly. His body lay that night at the post where he had worked so heroically for 36 hours, and which had now become his mortuary chapel. Captain Robertson remained on and later was joined by Captain Prior, R.M.O. to the 1st Otago Battalion. The slow evacuation of the wounded went on uninterruptedly, a fresh party of bearers had been despatched by Lt.-Col. Murray at about 9 p.m.; all the evening wounded had been coming in freely to Flat Iron, but some of the bearers from Bogle's Post took the Longueval–Flers road to their left returning. By 9.45 Lt.-Col. Murray reported that further parties were being sent on to Bogle's

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Post and that he hoped to have the whole area clear by the morning.

That night, about the same time, the A.D.M.S. had decided to establish a new dressing station at Longueval in order to assist the parties coming down from our right flank positions in and in front of Flers; to this effect he instructed Lt.-Col. Hardie Neil, N.Z.M.C., to collect his bearers and to proceed to Longueval forthwith in order to establish himself there. Again the A.D.M.S. had occasion to stress the importance of having telephonic communication with the A.D.S. as much time was lost by messengers on foot who frequently went astray at night or were delayed by shell fire. Curiously enough, the same idea had occurred to General Sixte von Arnim commanding the Bavarian Corps at the Somme in June, 1916. In his report of that date he says:—"Telephonic communications also assumed great importance in consequence of the wide distribution of the medical arrangements. It is desirable that the regulations should emphasise the importance of having adequate telephonic communications between all medical units in the line so that these units are not overlooked until all the other telephone lines have been provided." In order to get over the difficulties of intercommunication runners from the A.D.S. at Flat Iron Copse were detailed to the Brigade Headquarters of the 3rd and 1st Brigades situated in Carlton trench..

At midnight a very heavy close barrage was put down along the crest from Delville Wood to Highwood which completely interrupted our evacuations from Bogle's post for four hours; the curtain, calculated to prevent the division from bringing up supplies and supports was, at least for bearers carrying wounded, impassable. The vicinity of Thistle Dump was drenched with lachrymatory gas and heavily shelled by large calibre guns searching for our batteries; a most unpleasant night for the bearer relay post; the weather, too had broken; occasional showers were falling; one of the horsed waggons was lying ditched by the roadside.

MEDICAL OPERATIONS OF THE 17TH SEPTEMBER, 1916.

At 3 a.m. orders were issued by the XVth Corps for a resumption of the advance on the 18th. The divisions on the corps front were being relieved; the 41st on our right, by the 55th, whom we had previously relieved. The New Zealand Division alone remained unrelieved on the corps front. To our left, the doughty cockneys of the 47th Division also held out.

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By 4 a.m. the barrage on the Crest had slackened and the shell fire at Thistle Dump had so abated that the horsed ambulances were once more able to get up to the advanced A.D.S. The bearers were stated to be "on their last legs" and if more casualties were to occur, they would be unable to carry on. No. 3 Field Ambulance reached Green Dump before dawn and the O.C. Lieut.-Col. Hardie Neil, after reconnoitring the position as far as Bogle's Post found it impossible to get cars down the Flers–Longueval road; consequently, wounded would still have to be carried to Thistle Dump, the nearest point to a road open for vehicular traffic. Captain Gilmour, N.Z.M.C., with 30 infantrymen detailed to act as bearers had proceeded early to Bogle's Post where it was reported there were still some 80 stretcher cases; another party of 95 bearers under Captain Kemp, N.Z.M.C., had advanced at daylight from Thistle Dump. The combined parties soon cleared, and by 10 a.m. Major Martin by personal reconnaissance was able to report that the fateful R.A.P. was practically clear. Captain Reid of No. 1 New Zealand Field Ambulance relieved Captain Bogle, killed in action; Major Martin, Captain Robertson and Captain Prior remained on at the post during the morning.

Lieut.-Col. Hardie Neil, by 10 o'clock, had finally decided to establish his A.D.S. near Carlton trench at Green Dump about 600 yards to the east of Thistle Dump A.D.S., and near the Longueval–Bazentin road down which stretchers could be carried. His Brigade Headquarters were near at hand, and he was fortunate to be able to utilise a large dugout built by the New Zealand Pioneer Battalion when they were camped there prior to the arrival of the division; it had two tunnelled entrances 36ft. long and sufficiently wide to admit stretchers to a central chamber 9ft by 40ft which was suitable for use as a dressing room.

By noon the last of the wounded of the N.Z.R.B. were brought in, a heavy barrage was still falling and there were casualties amongst the stretcher parties; some of the bearers, who showed symptoms of gassing, had to be evacuated. At 3 p.m. the shelling about Bogle's Post became very violent, it was much exposed to view from the enemy positions about Gueudecourt, some 3000 yards away to the right. The few wounded remaining were hurriedly brought into the dugouts or the most sheltered positions; while doing this Major Martin was wounded by shrapnel in the abdomen, the face and the neck. A stretcher party was immediately organised by Captain Prior to carry him back to the A.D.S. at Thistle Dump, he passed through the A.D.S. at Flat Iron Copse

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at 5 p.m. and, in one of our own cars, proceeded to the New Zealand Stationary Hospital at Amiens, where he was operated on; but he died the same evening. Captain Bogle's body was brought in during the afternoon by the Rev. C. Huchen, Chaplain to the 1st N.Z.R.B. and buried in the cemetery at Montauban.

During the day there had been a very heavy bombardment of our front trenches and at Flers. At 5 p.m. the "A" branch detailed a party of 200 men of the 2nd Brigade to search for wounded and clear all the ground between the Flers and the Switch trenches. Major McCormack, N.Z.M.C. 2nd Field Ambulance went out in charge of this party. All R.A.P.'s were reported clear. The search party returned at midnight: they found no wounded lying out, the ground was clear—they brought in no wounded except their own casualties.

We will again take up Captain John's narrative for the 17th: "The next day, Sunday, they opened up on the village with their artillery and gave us beans all that afternoon and night. I expected a shell through the dressing station any minute. Everywhere else we were getting it; we had tear gas into the bargain. It was very curious, our eyes began to smart and run for no apparent reason, fortunately they did not give us any of the real gas." From Captain John's R.A.P. in Flers, the most advanced, the carry was now about two and a quarter miles as far as Thistle Dump, and about the same to Green Dump, from which point a further carriage by hand of three-quarters of a mile was necessary in order to reach the cars at Montauban; but the best route was still through Thistle Dump. Orders were issued this night for a resumption of the offensive on the 21st. Heavy rain was falling so delaying the operations. A congratulatory message came in from the Army commander, General Rawlinson, expressing high praise of the fine fighting spirit, the admirable energy and dash displayed by the New Zealand Division.

The week had opened in heavy rain which continued incessantly until Wednesday; the remainder of the week was dull and cloudy, so hindering preparations for a further offensive. The roads and the fore-field were now very difficult to negotiate: all further operations on a large scale were postponed until the 24th. Meanwhile minor operations still continued and very determined and costly trench fighting raged on our front in so adjusting our line and flanks as to give the division a dominating position, and the upper hand against the Bavarians. During the day of the 18th the 8th Londons came up on our left fighting their way through Drop Alley; while our right flank was establishing a firm

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junction with the 55th Division. The famous Quadrilateral was taken and the French had marked successes near Deniecourt. The casualties in the New Zealand Division reported up to this date were over 3000.

On the 19th, in the heavy rain, the bearers were much delayed by the mud; it was taking four hours to complete the trip to the Flers A.D.S. and back with a loaded stretcher through the churned up crater area. The motor ambulances too, were held up by the bad condition of the roads, but by 3 p.m. all R.A.P.'s were reported clear. Extra blankets and stretchers were now pushed up to the R.M.O.'s of the 1st Brigade holding the line. There was considerable shell fire in Flers where some of the New Zealand Sanitary Section were now engaged in testing the three wells located there and which our N.Z.E. were attempting to develop. The sanitary section reported the water to be free from metallic poisons and to be serviceable with chlorination. Of the condition of the fore-field, Captain Johns tells up something: "On Monday night we were relieved and went back about two and a half miles [to Green Dump] for a few days' rest—the most miserable night I've ever spent. We were about three hours floundering about in the mud and the shell holes. Talk about mud at this place! I never saw anything like it in my life—a regular sea of mud—it was so jolly slippery that now and again you would fall full length into it. We arrived absolutely mud from head to foot. I had about half my battalion on sick parade the next morning." It rained hard all that night and no one can doubt but that the allegedly resting brigade had a very wretched time in their bivouacs. It cleared somewhat during the morning of the 19th, but there was a marked increase in the numbers of sick admitted to the C.C.P. Dysentery had broken out amongst the troops on the Somme, and a few cases of trench foot were being evacuated from the front line. A supply of fresh socks and whale oil was finding its way, with difficulty as may be imagined, to the trenches.

There was bloody trench fighting on the 20th and 21st, at the junction between our left and the 1st Division who had now relieved the hard tried Londoners. The 2nd Canterbury Battalion had 150 casualties about Drop Alley in this operation, and the work of clearing the stretcher cases, already very difficult on account of the mud, was much impeded by a gas and H.E. barrage let down between Highwood and Delville wood; masks or goggles had to be worn by the bearers and several suffering from the effects of the gas had to be evacuated.

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100 men of the 1st Brigade were detailed to assist in the work; they were now able to use portion of a communication trench or avenue called "Turk Trench" a work of giants put through by our Maori Pioneers in an incredibly short time, it traversed the crest and permitted the carriage of stretchers. The going beyond was very heavy, there was some shelling, six bearers were required to each stretcher, the time taken for the return trip, five hours, so that the R.A.P.'s were not clear until 11.45 p.m.

That day a congratulatory message was received by the A.D.M.S. from the D.M.S. of the Fourth Army, which read as follows:—"The D.M.S. Fourth Army, and the D.D.M.S. XVth Corps desire to make known to all ranks of the N.Z.M.C. their appreciation of the work done during the recent operations: the arrangements for evacuation of wounded and the successful way in which these arrangements worked, met with their special approbation. Casualty clearing stations report that the treatment of all New Zealand wounded evacuated to them has reached a very high standard, and that no cases have been evacuated without having received anti-tetantic serum. The D.M.S. has communicated as above to the D.G.M.S., commanders of medical units and regimental officers will communicate this to all ranks under their command." This flattering message was duly published in medical corps orders and gave considerable encouragement everywhere to all ranks of the N.Z.M.C. Up to this date some 3423 casualties had been sustained by the division, of these, 2428 wounded, 495 killed, and 450 missing; of the wounded, over 2000 had been tended by the N.Z.M.C whose losses up to the 21st had been 5 officers, 66 O.R. killed or wounded. During the lull in the fighting it was found possible to rest the bearers, a section at a time.

We now may be permitted a moment to review the train of events that had befallen since the opening of the engagement. The casualties in the medical corps seemed inevitable owing to the very heavy and continuous shell fire and the very long routes of evacuation. Bearers were killed even in front of the A.D.S. at Flat Iron Copse; no place seemed to be exempt. The loss of two such brilliant officers as Bogle and Martin on the same day, and at the same post, was keenly felt by the corps. Martin was a dexterous surgeon, endowed with a maximal energy and indomitable courage. After a brilliant career as a student at Edinburgh he served in the South African war, and after taking his fellowship returned to New Zealand where he was appointed surgeon to the Palmerston North Hospital. In 1914 he

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was in America doing post graduate work, and on the outbreak of war had returned to England where he at once joined the R.A.M.C. going to the 15th Field Ambulance B.E.F. in September, just a few days before the fighting at the Aisne where he merited a mention in despatches for gallant and distinguished services; later he was appointed a surgeon specialist to the 6th General Hospital at Rouen. He returned to New Zealand in 1915, and, as we have seen, sat on the Trentham Camp Commission as a medical member. In February, 1916, he joined the Rifle Brigade Field Ambulance of which he was senior Major. His book "A Surgeon in Khaki," published in 1916, made him known and admired by a wide circle of readers, but to his friends his breezy nature, his attractive personality, and his strong, confident optimism, made him very dear, while in the field he was bold, resolute, resourceful and brave to a fault. He was not to be spared; we could ill afford to lose him. So equally, of Bogle, who was undoubtedly the best R.M.O. in the division. An Edinburgh rugby "blue," he was a leader in all forms of athleticism. He joined the 1st Battalion of the N.Z.R.B. in 1915, and sailed for Egypt in October, seeing service at Mersa Matruh during the Senussi rising. His brother officers of the battalion held him in the highest esteem, they found that to his men he was a real friend, trusted, beloved, and appealed to in every difficulty; no day's work was ever too long for him no duty too irksome. One officer of the battalion wrote of him:—"He was the finest gentlemen it has ever been my good fortune to meet. His capable and untiring work have been the admiration of us all; where all men were heroes his courage shone conspicuously. He always seemed so absolutely part of the battalion—in the mess—on the march—in the field, and was always so helpful to everybody that there is no one who could be so missed by officers and men." The three days, having cost us three medical officers wounded—Captain Duncan, Captain Brown and Captain Good of the 2nd Otago Battalion—and two killed, the A.D.M.S. issued special instructions to medical officers warning them to avoid needless exposure, and he instructed the field ambulance commanders not to proceed beyond their advanced dressing stations except under very special circumstances.

We have seen that the road from Becordel through Fricourt and Mametz was, beyond the last named village site, operable by motor vehicles, in fine weather, as far as the Flat Iron A.D.S. where there were a few splinter proofs and dugouts. Traffic beyond to the Thistle Dump bearer relay post, a small dugout

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Major A. A. Martin, N.Z.M.C.

Died of Wounds 17/9/1916.

Captain Gilbert Vere Bogle, N.Z.M.C.

Killed in Action 12/10/17.

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in a bank by the side of the Bazentin–Longueval road was usually maintained by three horse ambulances, when shelling permitted. Wheeled stretchers were also used as the road surface in places was quite good in fine weather. On arrival at the Flat Iron A.D.S. the walking wounded were tallied and fed; hot coffee, tea or cocoa was always available and biscuits, cakes and cigarettes were supplied by the New Zealand Y.M.C.A. in generous quantities. Char-a-bancs and motor lorries carried the walking and sitting wounded as far as the corps collecting post at Bécordel. The lying cases after warming up, dressing and feeding were loaded on to the ambulance cars of the division and were carried to the corps M.D.S. As there was no holding room at the A.D.S. all cases, even the most serious, had to be sent back in order to avoid congestion in the small dressing rooms: Wounded that needed re-dressing were dressed, otherwise they went on immediately. The A.D.S. at Flat Iron Copse was shared with an ambulance of the 47th London Division, so that both New Zealand and British wounded were passing through. The dressing rooms were attended by two officers of the 6th London Ambulance, two medical officers of the 2/2 Northumberland Field Ambulance and two officers of the N.Z.M.C. who worked in four-hourly shifts. This double banking was due to the short front held by each of the contiguous divisions, but the arrangement worked well, the various ambulances pooled their medical stores and transport so that there never was any deficiency in personnel, medical comforts, or stores or transport for evacuation, although, during the first day of the operations, 2460 British and New Zealand casualties passed through the dressing station. Lieut.-Col. Murray comments on these operations as follows:—"So far the arrangements worked well, in spite of the heavy barrage of high explosive and shrapnel which the enemy maintained on the crest, over which the bearers had to cross in the open, practically all the wounded of the 15th and 16th were cleared in 40 hours. A hitch occurred in evacuating the wounded of the 1st Battalion of the Rifle Brigade, through Green Dump, owing to the lack of exact information and some misunderstanding with the 41st Division. This could have been avoided by the brigade concerned sending a message direct to the B.R.P. at Thistle Dump which was only a short distance away from the Brigade Headquarters. As soon as their exact location was ascertained the wounded were quickly cleared. In order to keep close touch with brigades, runners from the field ambulances were attached to the headquarters of the

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brigades in action so that communication with A.D.S. could be rapidly established."

At the Corps collecting post Lieut-Col. O'Neil had devised a well organised scheme for dealing with the large numbers of wounded sick and stragglers, sometimes reaching a total of over 3000 in a day, coming down from the corps front in the 21 ambulance cars, 15 char-a-bancs and 7 lorries utilised in this service. By the use of extra marquees, some timber, many ammunition boxes and a few tarpaulin covers, a series of rooms had been constructed—the ordinary tentage of the field ambulances was of course quite inadequate for so large an establishment. The patients on arrival passed into a receiving room where they were seen by a medical officer called a "spotting" officer. His duty it was to sort out the more urgent cases so that they might have immediate attention and to place on stretchers and evacuate immediately to C.M.D.S. such wounded as were obviously not "sitting" cases but whose injuries were of a more serious nature. On leaving the reception room the patients filed through a recording office where the A.F.W. 3210 "buff slips" and the A.F.W. 3118 field medical card, not yet completed, but enclosed in the waterproof envelope were tied to the soldier's tunic. Other clerks in this department were constantly engaged in compiling the A. and D. books of the unit and the Form A.36, a nominal roll of casualties, and the A.F.W. 3185, a daily summary of evacuations by divisions; of these, A36 was the more important as it was the document by which casualties by name were notified to the base. With his "buff slip" and his field medical card, the wounded man was conducted to the waiting and refreshment room where, on seats improvised from ammunition boxes and warmed by charcoal braziers, he was regaled with hot drinks, food and cigarettes. In his turn the now somewhat comforted man was admitted to the dressing room where he first received his injection of A.T.S., the operation duly noted on his field card, buff slip, and on his wrist, where a large "T" in indelible ink was inscribed by the specially trained medical orderlies who alone controlled this department. Passing now into the hands of the medical officers his wounds were redressed, if necessary, and such surgical treatment as was demanded by splinting, removal of small superficial foreign bodies and so forth, was given, which being done the medical officer entered a description of the injury on the buff slip and the field medical card which was returned to its envelope and remained attached to the man, but the buff slip, purely an inter-departmental chit, passed back to the record

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office now bearing the official diagnosis and by its means the A36 was compiled. Great accuracy was required in the entries in the A. and D. books, and in the A36, as may be readily understood, as they furnished a permanent record of the man's injury and disposal. Behind the dressing rooms were two marquees marked respectively C.C.S. and C.R.S. (corps rest station), into these tents, also warmed by braziers, the men proceeded: cases requiring hospital treatment, for C.C.S.; others who might be anticipated to recover after a few days' rest, to the C.R.S. And as they accumulated, in batches of 25, they were marched to the evacuating officer. Separate roads for incoming and outgoing traffic had been delimited and later well metalled with broken bricks from the ruins of Bécordel. The average load of a char-a-banc was 25, of a motor lorry, 18, of a M.A.C. Car, 7 sitters; so the evacuating officer, after due scrutiny of the destination marked on the envelope of their field cards, disposed them and despatched them on their voyage to the rear. The sick of course passed through a separate channel on similar lines and those who were found to be clearly battle stragglers without obvious disability were marked R.T.D. for return to duty. They were well fed, and housed for the night, and in the morning handed over, after a final medical examination, to the police post, ultimately reaching the reinforcement camp from which they were despatched, re-equipped and foraged, to their respective units in the line. An ingenious device elaborated by one of our N.C.O.s provided illuminated signs which served by night to indicate the various departments to incoming traffic and groups of patients. The rate of evacuations from the C.C.P. was usually 100 per hour on busy occasions. Of conditions at the M.D.S. we will speak later on; we must now resume the narrative of our further operations.

The preparatory bombardment for the battle of the 25th began on the 24th, leading to an increasing enemy fire somewhat interfering with movement about Thistle Dump, where there was a great concentration of our guns. The new advance was to be on a large scale, covering six miles, the French Army and the Fifth Army were co-operating. On the Fourth Army front, Morval, Les Boeufs, and Gueudecourt were to be taken and the last organised enemy system, the Gird trenches, were to be wrested from the Bavarians. It was hoped that our cavalry would be able to get through near Gueudecourt, when a general advance might have been possible; the morale of the German Divisions in front was said to be badly shaken. It was known to us that the Bavarians in front had lost very heavily during the past

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few days. The task of the New Zealand Division was to take the Sugar Factory corner in front of Flers and a portion of the Gird system, where it seemed, the battle field ended, as beyond it there were smiling fields and standing crops and leafy trees. The distance to the final objectives was about one mile, it was to be accomplished in two separate movements; the first, covering a little less than half the distance, took place on the 25th; the final forward movement on the 27th.

In preparation for the forthcoming operations, the A.D.M.S. had made certain important dispositions. In consultation with the combatant branch, new R.A.P. sites were selected: in Flers, in a deep German dugout; and in the vicinity of Bogle's Post, where a new bearer relay post was formed, approachable along the Turk trench. All these posts were made splinter proof by our engineers. Thistle Dump was also somewhat strengthened and was to be used as an advanced A.D.S. despatching wounded direct to the corps stations. Officers commanding brigades were instructed to keep the A.D.S. parties informed as to the disposition of casualties and indicate the localities in which they were likely to be found. Owing to our heavy losses in medical personnel, the A.D.M.S. made further provisions for minimising these losses. First as regards the regimental officers: they were supplied with steel breastplates—Dayfield body shields—as issued to bombers; they were instructed to exercise care in avoiding needless exposure and to direct operations—after they had moved forward with the final wave of their battalions—entirely from the positions selected as R.A.P.'s by their commanding officers, and from which they were not to move. The medical officers in charge of forward evacuations were also to be provided with body shields—all medical officers at this time wore steel helmets when beyond the A.D.S.—and that they were not to visit R.A.P.'s with bearer parties once contact had been established; but that the parties should be led by senior N.C.O.'s. These recommendations became orders and had the sanction of Divisional Headquarters. The weather had now cleared and the ground had hardened somewhat.

MEDICAL OPERATIONS 25TH, 26TH AND 27TH SEPTEMBER, 1916.

The 1st New Zealand Brigade, the attackers, had completed the relief of the 3rd N.Z.R.B. by 6 a.m. on the 25th; zero hour was fixed for 12.30 p.m. By noon the ambulance bearers were in touch with all R.A.P.'s, a certain number detailed to act as runners for the R.M.O.'s. The new bearer relay post had been reinforced by parties from Thistle Dump. At 2, a heavy bombardment by our guns announced the opening of the attack and

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some 40 minutes later the 1st Brigade had attained its objectives. The cavalry pushed out beyond Gueudecourt and in the afternoon the New Zealand Division received a warning order that it hold itself in readiness to advance. By 5 p.m. nearly all wounded were in, several Germans amongst them. At no time were the attackers subjected to a great volume of fire, our losses were not considerable. 1st Canterbury who had the right of the attack at Sugar Factory corner were attended by their trusty R.M.O., Captain Johns, whose account of the battle is worth reading, he says:—"After a few days' rest we went up to the same village [Flers], and took over the same show. At first we got to the wrong end of the village and struck a hot lot of shrapnel, but eventually got to our right place without losing anybody. But there was not much sleep that night as the wounded were coming in pretty freely." [Lieut.-Col. Murray reports clearing 50 stretcher cases that night, 24/25.] "The battalion had an attack the next day. Wounded and prisoners began to flow in after midday; we had the show full of wounded when crash, came a shell through the roof—killed one man, gave my corporal a bang on the back which shot him out through the door, hit me on the elbow, and filled the place with dust. Two German wounded got up and fled, the third, a German Colonel, was pinned down by a beam and died just as we got him out." This officer was the Colonel commanding the 13th Bavarian Reserve Regiment, his Battalion Headquarters had been at Sugar Factory Corner.

Bearers were instructed to keep in close touch with the front line in view of a possible counter attack; but the night passed quietly enough. The day's operations had been successful everywhere; Morval and Les Boeufs were taken, the Fourth Army and the French had advanced at all points along the six mile front. The day of the 26th passed without any change in our position, but the guns were busy all day; the wounded came in freely. The bearers now worked in greater safety owing to the fact that they could use Turk trench, so well dug by our Pioneers, which provided 2,700 yards of excellent communication operable as far as Bogle's Post. Our losses for the two days amounted only to 44 killed, 235 wounded. On other parts of the front there were marked successes: Combles was at last pinched out by the French; on our left the fortress of Thiepval and the Hohenzollern redoubt fell, giving us clear possession of the whole of the Thiepval-Morval ridge. The enemy was denied all advantages of high ground and in front of us was a country of wheat and barley fields and pleasant villages as yet untouched by shell fire. But

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there still remained the formidable Gird system to be crossed. The attack was planned for the following day, the 27th, the artillery preparation had been going since the 25th, now under direct observation.

The morning of the 27th was quiet, the weather fine, all the movements of the enemy were fully in view; at 7.30 a.m., two Bavarian ambulance waggons could be seen approaching the ruined Abbey at Eaucourt, they remained a while to pick up wounded from the dressing station there, and retired unmolested on a good road towards the village of Le Barque, whose inquisitive church steeple peered at our lines behind its fringe of trees just a mile and a half from the factory corner. On our side the country was so torn and shattered that we could find no road for the conveyance of wounded nearer than two and three-quarter miles from our front line. The attack of the 1st Brigade was launched at 2.15 p.m. and was accompanied by an intense barrage. The 1st Wellington Battalion on the right penetrated the Gird system with ease and soon found touch with the 55th Division on our right. 1st Canterbury followed on the left; the 1st Auckland Battalion ran into M.G. fire and eventually reached Canterbury's left, but 1st Otago had a difficult task: along the left flank of their advance lay the strongly held "Goose Alley" its junction with the Gird System, 1200 yards ahead, was their objective. Three companies advanced in the open, one company bombing its way up Goose Alley; in the three companies. in the open, there were very heavy casualties from M.G. fire or shrapnel; the bombing company was held up near the junction and was obliged to put a stop in; the situation for a time "remained obscure." A tank was detailed to assist, and portion of the Rifle Brigade was put under Brigadier General Earle Johnson, C.B., to complete his closure of the left flank.

At 2.30 p.m. the bearers reached the Otago R.A.P. which Captain Prior had established in a cutting in the North road running from Flers to the Abbey at Eaucourt; by 4.30 walking wounded were coming through the Flat Iron, a few reaching Green Dump by the Flers road, but by 5.30 p.m. there was a heavy enemy barrage covering the Goose Alley. Captain Johns gives us some account of what happened that night:—"The next day [the 27th] the Battalion Headquarters moved up, I shifted out of the village of Flers further along a road to a dressing station, to be nearer my battalion as there was another attack on the same afternoon. We had no sooner got to it than the shells began to whistle about us and machine guns pumped in bullets on

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our left; the corporal got up the bank to see what was happening and got a bullet through his chest. I thought he was a goner at first but he pulled round and now is doing well. He got a Military Medal for work on the Peninsula and was also mentioned in despatches. He was a good chap and it was hard to lose him. However, we carried on with the water duty corporal and the batman, and had a great night of it. The Wellington Doctor put his lights out and went to bed, the Otago Doctor [Prior] was out looking for his wounded contrary to orders and as we were the final R.A.P. on the road from the scrap we had to take everybody who came our way. Thanks to the regimental stretcher bearers and later on other bearers, the lines were kept wonderfully free of wounded."

At 2 a.m. on the 28th the medical situation was clearer, extra bearers were sent up to the neighbourhood of Goose Alley. During the night 109 stretcher cases and 198 sitting and walking cases passed through the Flat Iron A.D.S.; the wounds were chiefly caused by M.G. fire and shrapnel, and there was a very large proportion of compound thigh and compound leg fractures. The regimental stretcher bearers of the Otago Battalion were nearly all killed or wounded and many wounded were still lying out at 7 a.m. on the 28th, so that 6 squads of ambulance bearers had to be sent to Captain Prior to assist his few remaining regimental stretcher bearers. Further, a disaster had befallen the 4th Battalion of the N.Z.R.B.: their tank did not materialise, they were caught by shrapnel at their assembly point; their losses were considerable. Divisional Headquarters decided to cancel the further attack. Our losses were now known to be heavy: by 11 a.m. 119 stretcher cases and 227 walking had passed through the A.D.S. and at 9 p.m. all available bearers were out; 200 blankets were carried up to the R.A.P.'s. Through the ensuing night many cases were brought in with severe compound fractures of the lower limbs who had been lying out in shell holes since the afternoon of the 27th, ungetatable and, in some instances, the wounds were now very foul. The carry had increased to three miles of hand carriage from Factory Corner. It was now very difficult to get rations and water up in limbers along the Longueval–Flers road, furthermore the road was frequently barraged and could be of no use for horsed ambulances. Our total casualties reported for the 27th and 28th were:— 55 killed, 52 missing, 259 wounded, total 366.

The morning of the 29th was misty. By 7 a.m. the relief of the 1st Brigade was complete; nearly all the wounded were in,

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few were now coming through the dressing stations. Fresh runners from the field ambulances were sent up to the R.A.P.'s and by the afternoon the battle field was wholly clear. The added casualties reported on this day, the 29th, brought our total losses up to 76 killed, 56 missing, 487 wounded, total 519, which was less than originally anticipated.

At Green Dump a strange fatality befell; there was a fair amount of shell fire there in the afternoon while the O.C. No. 3 Field Ambulance, a genial host, was preparing a recherché dinner for some of the battalion commanders of the 1st Brigade newly come in. An ill-fated 5.9, unbidden guest, fell upon his kitchen burying both the assistant cook and the dinner; the cook was a total loss, but the dinner, a joint of roast beef, was at length unearthed in the shell hole by some enterprising fossikers; but everybody preferred bully beef *au naturel*. The dinner otherwise was a great success. The same day 2 N.Z.M.C. men were injured by exploding Mill's grenades which they had inadvertently kicked. Half buried in the mud that held the rusted pin in place a stumbling foot frequently set free the spring and was shattered by the explosion. Green Dump was studded with these jettisoned grenades,

OPERATIONS ON THE 2ND OCTOBER, 1916.

The last operation, in which the New Zealand Division was engaged, was the taking of Eaucourt L'Abbaye by the 47th Division—now returned to our left—a hard fought soldiers' battle lasting two days and costing us many casualties. The 2nd Brigade were chiefly engaged although part of the 3rd Brigade was employed on the right. At 2.30 p.m. on the 2nd of October, the whole of the corps artillery was turned on in front of the New Zealand lines covering nearly 2000 yards,—no other division of the XVth Corps was moving—with this barrage oil drums ejected from mortars were mingled which, bursting after they landed, drenched the enemy trenches in sheets of flame. Our assaulting columns met with fire heavier than usual but, in spite of serious losses, had secured their objectives and a bit more than was required by 5 p.m. The oil drums had worked dreadful havoc: two groups of German dead, some 30 in all, were found in a holocaust so burnt as to be unrecognisable. But our casualties for the day were heavy: 106 killed, 108 missing, 378 wounded, of which some were reaching the A.D.S. by 5 p.m.—mostly severe wounds—many compound fractures. Rain fell during the night. By 6 a.m. on October the 2nd, 84 stretcher

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cases and 148 sitting had already passed through the Flat Iron and wounded were coming quickly all that day. The motor ambulances were able to get up as far as Thistle Dump, evacuating from there direct to M.D.S. By 6 p.m. 388 wounded had cleared the A.D.S. and the R.A.P.'s were reported clear. The carry was long and very difficult for the bearers as the ground in the open was much churned up owing to the rain. On the 3rd again it rained, but the wounded came in steadily and by the 4th no New Zealand wounded remained in the field. The total wounded for the three days was reported to be 772.

In heavy rain the lean, exhausted units of the division were relieved by the 41st Division after 23 days' fighting, with a total reported loss of: 61 officers killed, 3 missing, 198 wounded; other ranks, 1036 killed, 702 missing (of these only 22 prisoners, nearly 500 killed), 4745 wounded, a total casualty list of 6743, exclusive of the sick, well over a third of the effectives. The medical units were relieved by the ambulances of the 41st Division.

The only units to remain were the N.Z.F.A. Brigades who long before the division arrived had supported the corps front and who still were in action when their comrades shook the mud of the Somme battlefields from their numbed feet. Of the medical arrangements of these units, there is not much to know, their medical officers living at Brigade Headquarters, visiting their batteries from time to time, their wounded carried direct to the nearest advanced dressing stations, all too close in some instances to the batteries. On the 21st October, Captain N. F. Hitchcock, N.Z.M.C., R.M.O. to the 2nd Brigade, N.Z.F.A., was killed instantly with two artillery officers by a shell which penetrated the Headquarters dugout of the 5th Battery. A most painstaking and faithful R.M.O. who joined his Brigade at Moascar. This made the third officer we lost at the Somme. The total losses of the N.Z.M.C. were 3 officers killed in action, or died of wounds, 3 officers wounded, 15 O.R. killed, 89 wounded, being a third at least, of the effectives of the three field ambulances employed in the collecting zone, or 13.44 per cent. of the total establishment. The ultimate losses were minimised by improved communications, and to the Turk trench the Maoris dug the saving of many lives was due. In all some 8000 casualties were handled by the Flat Iron A.D.S., British and New Zealand soldiers, the average rate of evacuation being about 100 per hour, during heavy fighting. A striking testimony to the work done by the N.Z.M.C. bearers, apart from their losses, was the result attained by the infantry parties of 200 led by their officers on the

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17th, who found not a single wounded man of ours left out, but managed to get five casualties of their own.

At the corps collecting station, Lieut.-Col. O'Neil had a well organised establishment with adequate accommodation and good roads, all provided by his own parties and those of the 139th Field Ambulance attached; ultimately he had accommodation for 200 cases which he housed for one night during a breakdown on the L.O.C. which blocked the casualty clearing stations. In all this station dealt with 15,542 sick and wounded, of these 582 New Zealand sick, 2671 lightly wounded. The largest group dealt with in one day was 77 sick, 3122 wounded; the daily average being 150 sick, 500 wounded, evacuated at the rate of about 100 patients per hour.

At the corps main dressing station the New Zealand Section of three tent subdivisions had their own marquees of which one was fitted up as a dressing station with two operating tables; the teams worked in two shifts of twelve hours each. A special marquee was used for resuscitation from shock which at that date consisted in removing the clothing, putting on pyjamas, warming with bottles and hot blankets and transfusion of hypertonic saline solution. The anasthetics used were chloroform, and various mixtures of chloroform and ether. As the guillotine amputation was now condemned, the formal procedures were adopted, generally the eliptical flap method, the flaps packed with hypertonic saline solution. The objections to the "guillotine" method, only used in cases of advanced sepsis or gas gangrene, were these:—First a large surface of wound taking months to heal over with a disfiguring adherent scar; Secondly the necessity for further operation on the exposed bone. A very large number of splints were in use in these days, amongst them was the Thomas splint for fractured thighs, which Sir Anthony Boulby was at this time attempting to bring into universal use on the Somme, but the Liston long splint was still somewhat favoured in the ambulances on account of facility in transport. The memorandum of 1915 had advised the use of the Thomas splint by field ambulances but the method was not yet sufficiently stressed, much less enforced. We have seen that the D.M.S. was satisfied with the surgical work of the N.Z.M.C. teams working at the C.M.D.S.

Of the sickness wastage and the sanitary effort at the Somme, a few words must suffice. There was a markedly increased incidence of diarrhoea and "enteritis" noted during the lull in the fighting, this eventually proved to be the onset of an outbreak of bacillary dysentery: nearly 300 cases of "enteritis" were

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evacuated from the corps collecting station during the latter part of the month. The condition of the battle field and back areas was insanitary to a serious degree. Flies were prevalent in unusual numbers and were found to be breeding freely in recent horse manure—nothing had been done on transport or waggon lines to check fly breeding—there were no fly proof latrines even in the divisional back areas, nor where there, in many instances, dug latrines in forward areas. Every shell hole became a midden or a latrine—as evidence of this, a divisional routine order issued about the 20th instructed commanders to dig latrines in bivouac areas and that all refuse in shell holes was to be covered with earth. The congestion of troops and horses coming and going, with the frequent changes of Divisions, led to an accumulation of all manner of refuse in the forward areas which could not be buried even, during these periods of strenuous fighting, as the conservancy of such a battlefield was well nigh an impossibility. During our stay at the Somme, over 100 cases of diagnosed bacillary dysentery were notified in the division. The earliest cases were evacuated during the last week of September, but the largest numbers during the second week in October; the disease ceased abruptly when the division left the Somme. The epidemic, which was common to the whole Fourth Army, was, at first, attributed to carriers amongst the Anzac troops and the 29th Division. Owing to the relative mildness of the dysentery caused by Flexner type infections, it was currently thought that the Shiga baccillus alone was capable of causing severe epidemics in armies. The bacillary dysenteries of Gallipoli and the Balkans were Shiga in type. But in consequence of the Argonne outbreak amongst the French troops in August, 1916, Remlinger came to the conclusion that the Flexner type was quite capable of developing great toxicity and causing severe epidemics. The Flexner type preponderated at the Somme as it had in the Argonne. Furthermore, it was known that the Germans were suffering also from dysentery; and as we drove them back, and occupied their broken lines, so may we have inherited not only their dugouts but their diseases; added to which, contiguity—probably infected water—else why the soda water found in Flers? —and the fly plague, and the exhaustion of the ill fed troops, were principal causes. The sanitary officer was frequently employed in the dressing stations, but a detachment of our sanitary section proceeded to Green Dump on the 18th and was employed in the erection of fly-proof latrines about the reserve brigade area and the dressing station. They also supervised the burial of

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dead horses and food refuse in this area. By them the water supply at Flers was tested, and found to be free from chemical poisons, and its chlorination estimated; but this supply from wells, which was exploited by the New Zealand Engineers, could not come into general use as the site of the village was constantly under heavy shell fire and the road from Longueval almost impassable. Supplies for the trenches were chlorinated and passed forward in petrol tins by carrying parties. The Germans had thoroughly solved their water difficulty by sending up bottles of mineral water to their soldiers in the front line—large quantities of excellent soda water were found in captured dugouts. On September 25th, the following D.R.O. was issued:—"Even in the front line, at least one water duty man should be with each battalion to chlorinate water. It is essential that proper use be made of the measures issued to medical officers, which enable the water in petrol tins to be quickly and efficiently chlorinated; full instructions for their use have been issued." Four of the N.Z.M.C. water duty men were wounded in this duty.

In the matter of personal hygiene, little or nothing could be done for front line or reserve troops, with the exception of issues of dry socks. The following instructions were issued with regard to trench foot prevention. "Men in the trenches will be made to remove their putties and boots and socks, at least once a day to dry their feet and treat them with whale oil or anti-frostbite grease, and put on dry socks. Spare socks will be taken into the trenches by all ranks. Tight boots must not be worn, nor should the boots be laced tightly. The above will be published in all battalion and company orders." Baths were available at Vivier Mills for the details camp between 6 a.m. and 9 a.m.; 170 per hour was the maximal accommodation.

There was a marked increase in the P.U.O. rate for the division, a condition due to "trench fever" but not as yet wholly recognised. The disease was first described by Major T. H. D. Graham, R.A.M.C. in the summer of 1915, and was more closely defined in an article by Hunt and Rankin in the "Lancet" of November the 20th, 1915. The officers of the New Zealand Stationary Hospital at Salonica had independently observed the five day fever and Major Hurst, R.A.M.C., later consulting neurologist to Walton-on-Thames Hospital, had his attention first drawn to the disease at Salonica by Lieut.-Col. McGavin, N.Z.M.C., in January, 1916; as Major Hurst states in his paper in the "Lancet" dated October, 1916. There was even at this time some reason to believe that the disease was lice-borne, though a full

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knowledge of the fever and its importance was yet to come. Diseases of the respiratory system, which showed a high average in the divisional sickness wastage previously recorded, were below the average which we may attribute to the fact that the troops were almost exclusively living in bivouacs. Diseases of the nervous system, however, showed a threefold increase over previous averages, due to exhaustion and the heavy fighting. Some of the most severe types of "shell shock" were seen at the advanced dressing stations, conditions which Babinski describes as "oneiric delirium," probably caused by close proximity to an exploding shell. But the high controversies raging at this time, the new terminology:—"pithiatism," "hysteria," "psycho-neurosis," "war neurosis," and the differentiation of these obscure conditions were not as yet appreciated by front line medical officers. Our A.D.M.S. had already defined shell shock to be a condition associated with recognisable lesions; the other conditions, "hysteria," or "neurasthenia," he considered to be defineable as "morale shaken by shell-fire." On these criteria the N.Z.M.C. officers classified their cases. Delirium, stuprose states, deaf mutism, the presence of contusion and deafness due to rupture of the ear drums were accepted as good evidence of "shell shock" by concussion, if the case was so labelled by the R.M.O.; the other more complex and obscure conditions were classified as "debility" and were, at that time, not too sympathetically viewed by front line officers. The exact wording of Lieut.-Col. Begg's definition is now quoted as an interesting palimpsest showing one aspect of military thought in the obscure realm of the war neuroses in 1916:—"No man is to be evacuated as "shell shock" unless he shows obvious signs of definite lesion. Cases of unconsciousness following the bursting of a shell in close proximity, injured eardrums, paralysis or paresis, aphasia, etc., will be evacuated as 'wounded shell shock.' Cases of hysteria, neurasthenia, debility, etc., will be cleared as sick and shown under the above headings." This was a good working rule and was in accord with all later teaching and the local instructions issued by Surgeon-General O'Keefe, D.M.S. of the Fourth Army. The 1/1 South Midland C.C.S. which our stationary hospital had relieved, became a centre for the examination of the hysteria-neurasthenia type of cases, who were retained in the army area and returned to duty as soon as possible. Later we will reconsider this distressing problem of modern warfare; but it must be said now that the definition of the New Zealand A.D.M.S. did not please the neurologists.

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The sickness wastage rate of the division calculated as evacuations from C.C.S. out of army area to L.O.C. reached 10 per 1000 on the 23rd of September, the highest rate for the month, but in spite of all hardships and conditions which were of the severest nature even in modern warfare, the health of our troops was satisfactory to this extent that the mean rate of wastage was only 7.6 per 1000, whereas the mean rate for the whole of the Fourth Army was 8.4 during the six weeks we spent in the Somme Valley.

All during our operations at the Somme the New Zealand Stationary Hospital was busily employed at Amiens and some at least of our wounded and sick were fortunate enough to get there. During the month of October they admitted 679 wounded, 2228 sick; of the wounded 56 died and of the sick 2 only. At the end of the month there were 224 patients remaining, as their accommodation had been reduced by the opening of the convent schools. War or no war—though at Amiens the Gothas flew over by night to fill the role of the "sandman"—the little French girls had to go to school: with these war babies it was a case of "L'état de guerre, l'état normal." Another New Zealand medical unit, the H.S. *Maheno,* on her second commission, was plying between Havre and Southampton so that a New Zealander might by strange chances have passed from one of our ambulances to the New Zealand Stationary Hospital, thence by ambulance train to Havre, and by the *Maheno* ferried to Southampton, would have reached the 1st New Zealand General Hospital, then established at Brockenhurst in the New Forest.

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MAJOR-GENERAL SIR DONALD MCGAVIN, KT., C.M.G., D.S.O.
A.D.M.S. New Zealand Division, later D.G.M.S. New Zealand.

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CHAPTER X.

Sailly sur la Lys.

By the 14th of October, 1916, the New Zealand Division was taking over its winter quarters and sector of defence at Sailly sur la Lys, relieving the 5th Australian Division, then on its way to the Somme area. The 2nd Brigade, with the 3rd New Zealand Field Ambulance attached, went into Armentières there joining Frank's Force, a unit less than a division in strength, including part of the newly arrived 3rd Australian Division, and responsible for the Armentières defences. No. 1 New Zealand Field Ambulance took over from the 14th Australian Field Ambulance a main dressing station, baths, and a laundry at Sailly with an advanced dressing station at Fleurbaix in the Port-à-Clous Farm. No. 2 New Zealand Field Ambulance relieved the 15th Australian Field Ambulance, taking over the D.R.S. at Nouveau Monde, two miles south of Sailly on the road to Estaires with an A.D.S. at Eaton Hall. On the 20th, Lieut.-Col. McGavin, late O.C. New Zealand Stationary Hospital took up his appointment as A.D.M.S. of the division, relieving Colonel Begg, C.M.G., who was appointed D.D.M.S. of the IInd Anzac Corps. General Godley and his staff were at this time in Baillieul and the corps comprised the New Zealand Division, the 34th Division, and the 3rd Australian Division. First Anzac, now composed of the 1st, 2nd, 4th and 5th Australian Divisions, was in reality an Australian Corps, the term ANZAC no longer applied, in truth. IInd Anzac was still a part of the Second Army under General Plumer, whose command comprised four corps. The Second Army had a fine reputation, both for its fighting qualities, and for its administrative organisation, and had since 1914 maintained a dogged defence in the Ypres salient of evil fame, historic for its heroic sacrifices.

The sector of defence taken over by the New Zealand Division was that very battle ground where the 5th Australian Division had lost so heavily in July, in their disastrous raid against the Aubers Ridge, and was known as the Right, or Sailly sector,, in length approximating to 5,600 yards and extending from Bois Grenier nearly to L'Aventie. There were two equal subsectors, each held by a brigade. To our right was the 56th Division of the First Army with headquarters at La Gorgue; to our left was

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the 34th Division with headquarters at La Croix du Bac. The defensive system consisted of a continuous front line of sand-bagged breast work with a secondary line 70 yards in rear; the principles of defence were similar to those in force at Armentières in the summer; the position was organised in depth. In each sub-sector two battalions were allotted to the front line and subsidiary line, the other two battalions of the brigade being in reserve. In the support line the main part of the garrison lived, each battalion spending, as a rule, seven days in the trenches. The reserves of the brigades in line were living in billets in very dilapidated villages, farms, and buildings, many of them abandoned by their owners, some still occupied in part, and of the farms, a few still under limited cultivation. The depth of the whole system as far as the subsidiary line was about a mile. The policy of the Second Army was at present, to rest and train the troops for the forthcoming spring offensive. The local policy of the Corps was to maintain, improve and strengthen the front line defences, and to be aggressive as far as fighting patrols and raiding parties were concerned, in order to obtain information, to injure the enemy, and to maintain a strong aggressive spirit in the divisions. In accordance with this policy large numbers of officers and specialists were detached to the various schools of instruction of the Second Army; the work of strengthening, repairing and improving the front line was pushed on. A very extensive scheme of drainage had to be devised and constructed as a small stream which ran parallel with our trenches, the Laies was running bank high, threatening to inundate our works, which were everywhere water logged. Our investigations of the enemy line by fighting patrols and by raids showed that No Man's Land was very swampy, that the opposing front line trenches were filled with water, dilapidated, and unoccupied, that the Bavarian Corps who faced us were living in their support lines, and seemed to be less inclined for aggressive tactics than ourselves. In order to obtain this information, very determined raids had to be carried out penetrating well back into the enemy positions, not without casualties on our part; we had 57 killed, 206 wounded during the month of November. Our losses during these raids were at times not inconsiderable, but apart from raids, the sector was considered a very quiet one, and there was very little artillery activity on either side. Much of the losses incurred by us were mainly through artillery fire during enemy raids, which were, with one exception, not carried out with any show of determination.

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The medical arrangements made for the evacuation of wounded in the right subsector were as follows:—Two regimental aid posts with bearer relay posts were situated at Rifle Villa, and Eaton Hall respectively, in ruined houses adjacent to the support line and somewhat strengthened by sandbagging. Both posts could be cleared by wheeled stretchers along the Rue du Bois and Rue Pétillon to the A.D.S. at La Croix Lescornex, thence by waiting motor ambulance to the M.D.S. at Nouveau Monde; each R.A.P. had four bearers of the ambulance attached and at the A.D.S. there was one medical officer and 15 O.R. N.Z.M.C. In the left subsector there was a similar arrangement, except that the bearer relay posts were not up at the R.A.P.'s which were in the support trenches; the evacuations by wheeled stretchers along the road proceeded to the A.D.S. at Port-à-Clous farm near Fleurbaix where there were two cars always in readiness and one medical officer and six O.R. provided by the 1st Field Ambulance Main Dressing Station at the baths at Sailly. It would have been quite feasible to have worked the whole sector by means of one M.D.S. with two A.D.S.'s but the system had been taken over as it stood by the division and was not materially altered. In case of raids warning was given to the field ambulance concerned. It was found by experience that special medical arrangements and a temporary redistribution of medical personnel was necesary in dealing with the casualties from organised raids. We were fortunate in this sector in being able to get motor ambulances up to within easy range of the R.A.P.'s, in most cases, as the sector, always a quiet one, had never suffered prolonged destructive bombardments. The village of Fleurbaix, although very considerably damaged by shell fire still afforded a certain amount of billeting room, and at our end of the village there were many houses still intact: as for instance Port-à-Clous farm. Further back, say 2,500 yards from our front line, the farm houses had scarcely been touched, and afforded billets for the reserve battalions of the brigade in line.

At Sailly, beyond the destruction of the church by fire in 1914, there was little evidence of damage by artillery, and most of the houses, the schools and factories, were available for billeting. The M.D.S. of the No. 1 New Zealand Field Ambulance was situated close to a large bleach works where the laundry and baths were established, and had at one time formed part of the drying sheds used by the "blanchisserie," consequently, it was not of a very luxurious character, but by the aid of linen hangings, it had been made serviceable, clean and bright looking.

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At Nouveau Monde the dressing station was in a large, comparatively new garage associated with a distillery. Both field ambulances were evacuating to the 1st Australian C.C.S. at Estaires and were served by two motor ambulance convoys, the 22nd and the 14th. From the M.A.C.'s a motor cyclist was despatched daily to the M.D.S.'s a tally of wounded and sick for evacuation was made which was taken back to the M.A.C. commander, who then so adjusted the number of cars in his convoy as to clear all main dressing stations in one trip daily. Emergency cases could always be sent on by us in our own cars as required. The evacuation of wounded presented no difficulties as the enemy was unusually quiet on our front, and our battle casualties were usually light, but provision for the sick of the division—at first very numerous indeed owing to the exhaustion following the Somme operations, and the execrable wet gloomy weather of November and early December—became the first and most important work of the medical personnel.

The rest station taken over from the outgoing division had little to recommend it for our purposes: it had huts and tents for some 50 men; many of the huts were dilapidated and provided poor shelter, and for the severe winter in Flanders tents were, of course, out of the question. Material had to be provided out of the scanty stores of the C.R.E. which were to a greater extent required in the front line, as, owing to necessity for wintering troops in the Somme crater area, enormous quantities of timber and other trench materials had to be provided, leaving the Second Army temporarily a little short. With the assistance of some of the Pioneers and the bearers of the No. 2 Field Ambulance the more serviceable huts were covered with malthoid and lined with hessian,, the ceilings with calico. New huts were built from the wooden frames of condemned structures and lined inside and out with malthoid spread on wire netting. Three Nissen bow huts were also obtained from New Zealand Engineer stores, each providing accommodation for 10 men. Each hut was fitted with a small stove; a footway of "duck boarding" connected each with the two mess huts. A kitchen, a butcher's shop and a bath house were constructed, the hot water for the baths was provided by placing a 400 gallon tank on a specially constructed brick incinerator, the dry refuse furnishing the fuel. Each of the living huts was provided with floor, matting, beds and complete bed furniture, including sheets and pillow slips, while a few deck chairs struck a note of luxury in the improvised wards. Most of these additional

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comforts we owed to the generosity of the British Red Cross Society, whilst the Australian Branch supplied bed covers, bed gowns, pyjamas and hanging lamps to light the huts.

By the end of November the sickness wastage for the division had risen to 8.4 per thousand per week, the highest rate for any division in the Second Army, and the matter was brought promptly to the notice of the D.D.M.S., Colonel Begg, by Surgeon-General Porter, D.M.S. of the Second Army and after the manner of all such "reminders" was duly referred to our A.D.M.S. for explanation. Delay in completing the D.R.S. and insufficient accommodation for sick in the field ambulances were the chief causes operating to inflate the sick evacuations. There was much bronchial catarrh, some influenza, of a severe type, in one case verified by post-mortem examination. P.U.O. was much in evidence, very likely trench fever; there were cases of broncho-pneumonia; middle ear disease, stirred up by the bombardments at the Somme; and local septic conditions, chiefly caused by pediculosis and scabies, owing to absence of bathing facilities during September. Our artillery had just recently returned to the division and were much debilitated by their long tour of duty. There were many obvious sanitary defects not as yet remedied: draughty, uncomfortable and dilapidated billets, poor cooking arrangements; absence, at least for the moment, of drying rooms, wet ill-drained trenches; hot ill-ventilated, stuffy estaminets; problems at present under consideration and receiving attention, but in the general remoulding of the sorry state of things, there was need for time, much material, considerable labour, and the expenditure of prescient thought. But while the fighting men were busy paying inquisite calls on their neighbours, across towards Lille, strengthening their front line, draining thei drowned trenches, surveying their No Man's Land, and attempting to make it a part of New Zealand, commanding officers had little time to devote to the frills of fireside arrangements; the men were working assiduously and were as a rule too tired and too careless to make much of themselves when off duty, the fever of the Somme was still in their bones—they were too restless to settle down and make a "cushy" job of it. Consequently they fell ill and the A.D.M.S. was duly admonished by the D.D.M.S., who in turn had received the expressions of disapproval of the D.M.S. Our wastage rate was exercising some slight upward pressure on the curve of the Second Army rate of evacuation for sickness.

In order to appreciate the true inwardness of sickness wastage rates in any army in the field it is necessary to understand that there are two types of wastage: first, the wastage of the division

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caused by the evacuation of sick to the C.C.S. From such a wastage no harm to the Army reputation ensues, as the C.C.S. is an Army unit, the sick man is still *chez-lui,* at home in the bosom of the Army family. But if he has to be evacuated beyond the C.C.S. he passes out of the Army on to those dark and devious ways called the L.O.C., where in his further peregrinations through General Hospitals and the Convalescent Camps, he vanishes from sight and the Army mourns his loss, which now becomes an Army wastage. Evacuations from the C.C.S. are not wholly dictated by the severity of the case but are, more frequently a question of accommodation, hence, if divisions send down too many sick at a time, a certain amount of overflow at C.C.S. follows, as the clearing station must clear to keep some beds open for battle casualties. The advantages, then of having adequate D.R.S. accommodation are two-fold: first, there is provision for comfort and treatment for minor ailments betimes, so warding off the advent of possible complications; and, secondly, it provides a reservoir in the divisional area which so regulates the flow of sick to the C.C.S. as to keep down both the Divisional and the Army rate of wastage. This latter is not in its essence a "paper" saving, it is a very real advantage as it prevents congestion on the L.O.C. units and in turn regulates the flow of sick and wounded to the home bases, so saving undue wastage to the Field Force.

By the Divisional sick rate we mean the average number per thousand evacuated weekly to C.C.S., the Army wastage is, of course, lower as it expresses the loss per week per 1000 of sick evacuated out of the Army area to the L.O.C. units: general hospitals and base hospitals. It may be of interest to compare divisional wastage rates as set out in the following table, showing wastage in four battalions of the 1st Brigade in Gallipoli in July, 1915, at Armentières in July, 1916, and at Sailly in November, 1916, the period at present under consideration.

TABLE SHOWING SICKNESS WASTAGE TO L.O.C. FROM THE NEW ZEALAND BRIGADE AT THREE PERIODS, IN PER THOUSAND, PER WEEK.

Unit	Gallipoli July, 1915	Armentières July, 1916	Sailly November, 1916
1st Auckland ..	92.4	5.15	3.19
1st Wellington ..	23.8	7.76	6.17
1st Otago ..	26.6	9.16	11.21
1st Canterbury ..	44.8	6.9	8.85
Average for Brigade ..	46.9	7.2	7.35
Rate for Division ..	86.1	8.3	8.2

Average rate for Second Army, October, 1916, 5.56.

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The three periods have this in common: the sick rate was abormally high; each period was marked by considerable activity without heavy fighting. The last period, winter 1916, corresponds with the acme of the reaction following the hardships of the Somme fighting and in this way resembles the Gallipoli period. The Gallipoli wastage is now seen in its most lurid light. An approximation to the normal sickness wastage from a division would be something about the average of the Second Army wastage which varied between 4 and 6 per 1000 per week; we have seen that the Fourth Army had a rate of 8 per 1000 during September, 1916, a very high rate of wastage, due, in this instance, to an outbreak of dysentery and the unusually trying conditions of the Somme fighting. The average for the New Zealand Division during the first year in France was 5.7, but always higher than the average of the Second Army, which was rather under than over 5 per 1000 per week. During this winter, for every man evacuated for wounds from the Second Army, three men were evacuated for sickness.

It was late in November before there was anything approaching reasonable accommodation and comfort at the D.R.S.; there were then 26 huts in all providing accommodation for 120 sick, some 30 others occupied the roomy brick garage and the loft above it. The provision for heating and lighting arrangements for the huts was achieved by drawing stoves and lamps from the N.Z.E. stores, supplemented by donations from the Red Cross Society. As regards stores drawn from the Red Cross Society, there was a certain reluctance on the part of the Army authorities to avail themselves over much of the generosity of Red Cross depots: the reasons, which were partly military and partly strategical, were quite sound. One of these reasons was that the Army was averse from allowing mobile medical units such as the field ambulance and the C.C.S. to become encumbered by equipment or materiel, which although invaluable in providing for the more efficient treatment of sick and wounded in stationary warfare, might limit mobility in a war of movement. The essential characteristic of a mobile medical unit is mobility, and movement depends upon transport; loads are known and calculated in advance and a certain number of vehicles are allotted to the unit proportionally—any increase in loads must limit the essential mobility, on which depends the facility with which the unit can develop its tactical functions. It was an army ruling that only such stores as could not be obtained from Ordnance might be procured from the Red Cross depots; but as there were minor

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difficulties of delay in obtaining ordnance stores by indent, many medical units disobeyed this rule. Infractions of the orders, however, were made apparent to the Army by means of the monthly returns of goods supplied, now furnished regularly by the Red Cross Society. Only such articles then, as seemed indispensable and which could not be drawn from Ordnance were obtained by the D.R.S. from the British and Australian Red Cross stores. Of the generosity and willingness to help of these societies little that is adequate can be said; to their munificence there was only one bound—the reticence of the indenting unit, fortified by the frugal hand of the A.D.M.S. whose duty it was to endorse all requisitions in terms of the intentions of the Army Commander. As was natural, there was some little diffidence on the part of our commanders in drawing from Australian Red Cross depots, as New Zealand was subscribing to the parent branch in England. It was thought at Headquarters in London that if New Zealand Units drew from Australian Red Cross that the Dominion should, in equity, reimburse the Australian Society. But there never was any serious question of reimbursement of the Australian Society. Lieut.-Col. Heaton Rhodes, our Red Cross Commissioner in Egypt in 1915, when he had drawn on Australia for supplies, had offered to make these good as they became available in our hospitals, but Mr. Norman Brooker, the A.I.F. Red Cross Commissioner refused to accept anything. Colonel Murdoch, the Australian Commissioner in England, and his successor, Colonel Hayward, had at all times refused to accept anything in payment; Colonel Murdoch from the first had advised Mr. Elgar the New Zealand Red Cross Commissioner in England, that it would not be necessary to establish stores in France as he, Colonel Murdoch, regarded the New Zealanders as Australians and would at all times do anything he could for us. So it was that in France the New Zealand Medical Units drew stores from the British Red Cross or Australian Red Cross, either or both, as was most convenient, and are much beholden to the generosity of the Australians in this matter.

As to the working of the D.R.S., it functioned as a tent subdivision of a field ambulance with some added equipment and stores; beds, for instance, and bed linen, and a supply of food stuffs suitable for the class of case treated. Prior to admission to the rest station the sick had been taken in to the receiving department of a field ambulance where, if the nature of the illness was not such as demanded immediate evacuation to C.C.S., they were detained for observation for several days so as to eliminate,

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if possible, infectious disease. As a rule, the patient was kept in bed—that is, he had the use of a straw-filled palliasse and the blankets always carried by the field ambulances. If the ailment was now obviously a minor one, the patient was sufficiently recovered to proceed to the rest station for a week's convalescence. The D.R.S. took in cases daily at 3.30 p.m.; on arrival, the patient was carefully examined by a senior medical officer, he had a hot bath, he was then given a change of underclothing, a towel, slippers and pyjamas, and retired to bed. Rest was encouraged for the first few days. Four liberal meals on an improved dietary, including eggs, vegetables, and milk, were supplied daily. Later short spells of physical exercises and route marches formed part of the treatment. The seven days allowed at the rest station were generally sufficient for complete convalescence. 85 per cent. of the admissions were discharged fit for duty within the period prescribed, which, with the four or five days spent at the field ambulance, gave the soldier a liberal 10 days complete change and rest with abundance of palatable and nutritive food. On discharge the soldier went to the reinforcement camp—not to his unit direct. In some rest stations it had been customary to supply the soldier with clothing and equipment, but not with arms, so that he could return to his unit fully equipped for the field; a necessary provision in many instances, and in order to meet this requirement a small supply of clothing, boots and equipment was kept at the D.R.S. But the A.A. and Q.M.G. of the New Zealand Division did not approve of this for economic reasons: the reinforcement camp, close at hand, was in possession of the necessary stores, consequently it was better to send the convalescents there, where final equipment was provided for, and from whence they could rejoin unit with a draft under escort. As far as possible it was the policy of the D.R.S. to discharge convalescents when their unit was out of the trenches, so obviating a too sudden change from conditions of rare comfort and ease to conditions of appalling severity during the severe winter months. If discharged to their unit when in billets the men had at least a few days in which to get hardened before the next tour of duty in the trenches.

The coal supply of the D.R.S. presented some little difficulty at first; the regulation issue of fuel at this time was: 3 lbs of wood, ¾-lb. of coal per man per day for troops not in the trenches, for troops in line, 1½ lbs. of coke and ½-lb. of charcoal per man per day. Most of this fuel was utilised in the company kitchens; a portion was earmarked for the divisional baths—great eaters of coal. Luckily the divisional fuel issue was mainly coal, supplied

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as a substitute for wood at the rate of 1 lb. to 2 lb. of wood. The amount of coal consumed in the baths was variable, but nearly always exceeded the total of the day's fuel allowance of the men bathed. It was exceedingly difficult for the army to provide extra fuel to field units, and local purchases of coal were not approved by the French Government as so many of their most productive mines were in enemy occupation; coal was scarce and high priced. There were now a large number of huts at the D.R.S. each furnished with a stove; the fuel ration was so inadequate that permission had to be obtained to purchase coal locally, at first out of a fund provided by the Chaplain's Department, but later out of a special "hospital comforts" fund authorised by the G.O.C. in charge Administration in the United Kingdom.

There was, for officers, a rest house controlled by IInd Anzac Corps. At first established at Nouveau Monde and run by the 5th Australian Division, it was, in the winter of 1916, transferred to La Motte. The Chateau of La Motte au Bois was hidden in a clearing in the Forest of Nieppe, on the road between Hazebrouck and Merville. Surrounded by an ancient moat it had a romantic appearance and was so far back from the front line as to be much quieter than Nouveau Monde where the sounds of battle were distinctly too near and too individually recognisable to be conductive to rest for jaded officers. The chateau was well suited to its purpose as it had large handsomely furnished rooms providing a dining room, a library, and a billiard room; there was accommodation for 25 officers and their batmen. The period of rest allowed was 14 days and the class of case most suitable was the officer who was run down or suffering from some minor ailment which could be benefited by a quiet comfortable rest in pleasant surroundings. The chatelaine, Me. La Baronne de la Grange, who was unfailing in her endeavours to make the officer patients comfortable, remained in residence in a separate wing, and was widely known to the higher command by reason of her hospitality. A detachment of ours under Major Walton, N.Z.M.C. was detailed for the service of the Anzac Officers' Rest House; later Major Izard, N.Z.M.C. succeeded, and ultimately the whole detachment was relieved by Australian details in July, 1917.

Another important medical establishment to be reconstituted was the dental hospital. As we have seen, prior to leaving for the Somme there were six dental sections attached to the division, but as there was as yet no provision for the transport of their heavy equipment they had to be sent to the base in August. Shortly after arrival in winter quarters the A.D.M.S. applied to

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have the dental sections returned to the division. Late in October three dental sections, of these two incomplete, were sent up in reply to the demand, but it was found that three dental sections were insufficient to cope with the work which had now accumulated in the division. But the existing dental policy was to maintain a minimum of dental officers with the division and a maximum at the base and in England, so as to ensure that drafts arriving from New Zealand could be made dentally fit before going to the front. This policy had been agreed to by the late A.D.M.S., Colonel Begg, C.M.G., and Major Finn, D.S.O., N.Z.D.C., the dental administrative officer, at a conference held in the Somme area after the relief of the division, and had been confirmed by the G.O.C. in charge of Administration. But reviewing reports of dental officers of this period, it seems clear that there was a considerable amount of work to be done everywhere: even on the transports leaving New Zealand the dental officer who was posted to each transport was overwhelmed with work. At the bases in England and in the hospitals there was a shortage of dental personnel and at the base at Etaples the corps were fully employed. Wherever there were troops, there the services of the N.Z.D.C. were urgently required. This, of course, argues very high ideals of oral prophylaxis animating the zealous officers of the N.Z.D.C. But above all places, unquestionably the front line had most need of dental work: to save wastage, and to preserve the health of the fighting men; more especially as it was apparent that, owing to the shortage of dental personnel in the U.K. Base, many men were going forward with the reinforcements who needed attention. But in England it appeared that the only solution to the problem was to concentrate on dental work at the Infantry Base Depot at Sling as many men were arriving from New Zealand dentally unfit. In this impasse, the A.D.M.S. Colonel McGavin, called for a report from the senior dental officer with the division, Captain Dearsley, N.Z.D.C. From the report furnished it was shown that the dental condition of the division was very bad and that two dentists and four mechanics could not keep pace with the work. The mechanics were working half the night in order to complete 50 dentures and an equal number of repairs to plates during the week. Many of the reinforcements had been hurriedly supplied with dentures in New Zealand which now required remaking owing to shrinkage. There was some little difficulty in obtaining a complete equipment of expendible instruments, although normal requirements were fully and promptly met by No. 11 Base Depot of medical stores.

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The most important part of the report, however, showed the solution of the difficulty, which was: to obtain the services of the many dental mechanics serving in other arms of the division and of the dental officers who were amongst the combatants; and to have the instruments sent over from England by the A.D.O. Major Finn. Armed with this report Colonel McGavin conferred with General Russell, and ultimately the G.O.C. N.Z.E.F. agreed to the temporary appointment of one dental officer and nine mechanics, all obtained from the division. So the dental hospital was established in November in a small communal school with a few huts attached. There were two rooms, one used by the surgeons, the other by the mechanics; heating, lighting and much needed repairs to the buildings presented difficulties which were not overcome for some time owing to shortage of material, but as the dental hospital was attached to the 2nd Field Ambulance for pay, rations, supplies and discipline, the field ambulance in conjunction with the Sanitary Section provided labour and material for repairs and the necessary alterations or technical structures. Days of attendance were allotted to brigades and other formations, Sundays were also work days and were devoted to officers. The N.Z.D.C. worked hard and well, in their first two months they treated 1702 cases; and owing to the close proximity to the trenches—the front line was only 3¾ miles away—of a fully equipped dental establishment capable of executing any type of work required, a soldier could come down from the most advanced positions and have efficient treatment without being more than a few hours absent from his duties in the line. A very important work performed by the dental officers this winter was the prophylaxis and treatment of "trench mouth" or ulcero-membranous gingivitis, caused by Vincent's organisms, now very prevalent amongst the men and in the opinion of some observers the cause of secondary lung complications of a severe type.

The duties of the Sanitary Section, now under the command of Major Sinclair, N.Z.M.C., D.P.H.—appointed in November, 1916—were, as may be imagined, very varied. The water supplies of the division were patrolled and examined from time to time for chlorination; pumps and wells were charted and the quality of the water noted; samples were collected from water carts and tested for chlorination. Three villages, Croix du Bac, Sailly sur la Lys, and Le Nouveau Monde, all situated on the pavé from Armentières southwards, and the last named town, came under the supervision of the New Zealand Section as regards

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notification and control of infectious diseases and general sanitary precautions, such as: the upkeep of public conveniences, the collection and incineration of all refuse from civilian houses—there was a numerous civil population in all these villages—and disposal of refuse and latrine pail contents from all billets used by the troops in the village areas. Twenty-seven civilian labourers were employed in this work of conservancy and the usual cleaning of roads and drains. The inspection of estaminets, shops where food was exposed for sale, and slaughter houses formed part of the routine. In the case of the estaminets, owing to a serious outbreak of diphtheria in two divisions coming from the Somme, which had spread to the civilian population, certain precautions were rigidly enforced by the Second Army one of which was the adequate sterilisation of the glasses used for dispensing beer; all estaminets and canteens were compelled to cleanse drinking vessels thoroughly and to disinfect them by dipping in boiling water rim downwards, or by immersion in permanganate solution for five minutes, the latter being the more practical method; it was the duty of the sanitary sections to see that this was done. The Sanitary Section acted as the local Public Health authority, and as such had the sanction of the French authorities to deal with the civilians as with the military population. Adequate bacteriological or chemical examination or analysis were always at their disposal by means of the mobile laboratories of the Second Army. The section soon found the necessity of establishing a workshop in which a considerable amount of sanitary apparatus was manufactured for the use of units. In their "sanitary area" they had constructed a very large back feed destructor which was capable of dealing with the refuse of all kinds, both military and civilian in Sailly; a special straining and mixing shed was attached where the pail matter could be segregated, the liquid from the solids, the solids mixed with saw dust, dried and ultimately incinerated. Most of this work carried out with improvised materials found in the vicinity. Of the back fed incinerators there could be no doubt as to their efficiency.

One of the most important duties of the Sanitary Section was the daily disinfection of the blankets by means of the "Clayton" sulphur dioxide apparatus, a service undertaken with the object of combating lice infestation and the dissemination of scabies. The Fodden Lorry Disinfector, with two "Thresh" chambers, could deal only with 60 blankets per hour, 30 blankets being the maximum load for each chamber: twenty minutes were taken up in heating and expelling air; twenty minutes in steaming and

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twenty minutes in drying, so that the output per diem was inadequate and furthermore the apparatus was required for other purposes. It was therefore recommended that all blankets in use in the division should be brought to the Clayton apparatus for periodic treatment. Men attending the baths brought their blanket—only one was in use in the trenches—to the Sanitary Section plant, where 1000 blankets or all the blankets of the bathers could be dealt with; the time taken being three hours, with some assistance given by two men per unit bringing blankets.

The divisional baths and laundries operated by No. 1 New Zealand Field Ambulance at Sailly had a capacity of 1000 men per diem and had been improved by the addition of much needed machinery; the laundry employed 150 women and was capable of delivering 40,000 pieces of washing, duly repaired, in one week. During the winter months there was an inevitable increase in lice infestation and in the incidence of scabies in spite of the activities of the baths, now called "Cleansing Stations," caused by close propinquity in dugouts where blankets were communal property and usually shared by the men. It was even made a ground of complaint by the civilian population at home that men proceeding on leave were frequently infested and that they distributed both pediculosis and scabies in England. Methods of disinfestation in use at this time were faulty: as it was impossible to treat all men of a unit on the same day the clean mingled with the unclean in billets or dugouts, the regimental blankets were shared and the "carriers" who shunned the baths redistributed the infestation. Another cause for the continuance of infestation after delousing was not recognised at this time: the fact, lately emphasised by Lloyd, that *P. Vestimentorum* sometimes lays its eggs on the pubic and axillary hairs where they remain undetected and undamaged by the bath. Apart from the danger from typhus fever, and the now growing opinion that trench fever was carried by lice—not yet fully established by experiment—the local irritation of the skin and infestations productive of impetigo in its various forms, were a serious source of wastage. Evacuation out of the division by sickness due to I.C.T. (local septic conditions), and to skin diseases, showed a definite increase during the winter months: both curves were on a slowly rising gradient which determined a higher average each year from these causes. Scabies, also was much more common and was responsible for much of the wastage by skin diseases and I.C.T. such as furunculosis, superficial abscesses, and impetiginous manifestations. One of the causes of the spread of scabies was the

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general leave to England, probably, and the opportunity it afforded for infection by prostitutes. As in the case of *Phthyrius inguinalis*, the *Sarcoptes* of scabies is frequently disseminated by coitus. Sir Malcolm Morris is of opinion that "it is only by close and prolonged contact between healthy and infected that scabies can be conveyed, though indirect contagion by means of underclothing or bed clothes is possible." Knowing the feeble migratory power of the louse and its ill-developed hunting instincts we can reasonably deny to a much feebler and smaller organism the *Sarcoptes*, any such powers at all; and as the ova are invariably laid in burrows in the skin of the host it is difficult to envisage the spread of this parasite by means of fomites unless we assume an exchange of shirts between the carrier and the healthy.

The D.D.M.S. aware of the increase of parasitic skin diseases in the division—which was noticeable elsewhere throughout the Army—issued the following instructions:—"Regimental medical officers, when possible, should attend with their men at Divisional Baths, in order that they may examine the men and detect cases of scabies and impetigo. If circumstances render it impossible for the medical officer to attend, the A.D.M.S. should detail a medical officer for the purpose." As it was not found possible for a regimental medical officer to attend with his men, a special medical "spotting" officer was detailed by No. 1 New Zealand Field Ambulance for the purpose. All bathers passed before this "spotting" officer when they were stripped; those who showed signs of skin disease were segregated for further examination and treatment. The examination of some 1000 to 1200 men a day was found to be a task beyond the endurance of one medical officer, and a compromise was effected by training nursing orderlies as spotters. In all cases the men seen by them were held over for the examination of the medical officer at stated hours. These spotters, in time, became remarkably proficient and could readily identify the various forms of skin disease. Most medical officers had had an opportunity of attending the demonstration of scabies at the 12th C.C.S. Hazebrouck while attached to the army school of sanitation; diagnosis was now on a higher level of accuracy, but even with experience the exact diagnosis was often a matter of considerable difficulty in the case of soldiers who had opportunities for bathing. The typical burrows of scabies are often absent and collateral signs such as impetigo, especially of the genitals, post cubital or popliteal regions were the only criteria—but indeed, pathognomonic, in most cases. It was in connection with this crusade against parasitism that the Clayton SO_2

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apparatus was used to disinfest blankets and by this means the blankets of all bathers could be dealt with in one day. The average number of cases of scabies coming in from the "spotting" officers was about 6.5 per diem in January, 1917; the average daily number under treatment in the ambulances was 129. It has been estimated that 25 per cent. of the sick wastage from the British Armies was due to simple skin lesions, the result of scabies or pediculosis.*

There had been a perceptible rise in the venereal curve during the winter, attributed to leave being granted freely both to London and to Paris; the average for 10 weeks up to January 6th, 1917, had been 11.4 cases per week, of these, two-thirds infected in London. Colonel Begg called for a report on this matter from the division; the report showed that very little venereal disease was of local origin. Suspected women in the area were brought promptly to the notice of the A.P.M. by the field ambulances; quarantine and inspection by a civilian medical practitioner followed; and, later, deportation by the French Army Authorities acting through the local Gendarmerie—if the woman proved to be infected. Weekly V.D. inspections were carried out in all units with good results, several cases being detected each week that otherwise would have been concealed. The A.D.M.S. had already made representations to the G.O.C. in the matter. As the outcome of much serious consideration it was decided to issue to each man a special card similar to that in use in the Australian Divisions, on which was inscribed a strongly worded appeal to men going on leave to follow Lord Kitchener's advice: to avoid strong drink and to respect womankind; to be chaste and to be temperate. But there was more than this, there was also an indication of the helping hand for those who had been led astray and very clear instructions as to where to report in London for prophylactic treatment. Several "blue light" stations for early treatment had been established both at Australian and New Zealand Headquarters and at many hospitals in London, where no questions were asked, no names were taken, and where all that could be done was done under highly expert advisers to eliminate the risks of infection *post factum*. Ante coital prophylaxis was not advised by the New Zealand Division, but in order that the man might be able to treat himself if not within reach of a blue light establishment, a nargol outfit was recommended and the men proceeding on leave were supplied on request with outfits which contained protargol jelly for injection and a calomel cream. Similar outfits were in use in the Navy and had been taken by us from German prisoners in Armentières.

* Official History of the War, Medical, Vol. 1, page 7.

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At a time of minimal activity, such as the winter of 1916, in the Second Army when all other branches of the service were attending courses of instruction the need for some school for medical personnel became very prominent. For some time past it had been manifest that the training of medical officers joining the Division was inadequate to the needs of front line units. To remedy this, the formation of a divisional school for the training of regimental medical officers was brought up as a proposal to the D.D.M.S. IInd Anzac. Colonel Begg was heartily in sympathy with the movement as he had already expressed strong opinions on the matter in his first report on the work of medical units attached to the Division in June, 1916, wherein he had emphasised the difficulty in obtaining trained regimental medical officers, and the patent fact that in many cases no adequate training had been undergone by reinforcement officers. He had recommended that medical officers should receive a thorough course of instruction in New Zealand under experienced officers prior to embarkation and added that lack of training in N.Z.M.C. officers had greatly increased the work and anxiety of the medical administration of the Division. The D.D.M.S. decided to make the school a Corps affair; he appointed Lt.-Col. Irvine, R.A.M.C.—who was O.C. of the 102nd Field Ambulance of the neighbouring Division, the 34th—and the late Major A. V. Short, M.C., N.Z.M.C. then a captain, as commandant and adjutant of the IInd Anzac Medical Officers School. The selection was a happy one; Lt.-Col. Irvine was an experienced officer who had already shown considerable keenness in instructing the junior officers attached to his field ambulance and Captain Short, M.C., had had considerable experience in Egypt, Gallipoli and at the Somme, being a "Main Body" man who had graduated through the O.T.C. at Otago University; he was a good drill and in every way a very efficient young officer. The commandant prepared a syllabus of training which included subjects outside the purely medical considerations, and made provision for a variety of lectures by competent officers on R.E. work, the A.S.C. and transport services and other administrative subjects. The syllabus was approved and the school opened on December 1st. A small villa on the Merville road in Estaires was appropriated, affording accommodation for nine officers. The class proposed was four officers from each division, being 12; some extra billets had to be found; while mess equipment was provided out of funds lent by the D.D.M.S.. The first course was attended by ten medical officers: four from each of the Anzac Divisions, two from the 34th, who were very short of officers. The routine was as follows: 9 to

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9.30 a.m. squad drill; 10 to 12, lectures; at 1 o'clock, lunch; lectures from 2 p.m. to 4; and dinner at 6. The lectures covered a wide variety of topics, and were diversified by various demonstrations at selected field ambulances and C.C.S.'s; there was even a riding school, and lectures on horse mastership and the diseases of horses. At the end of the course officers were set a general knowledge paper of 16 questions, embracing the various subjects treated during the course. The second session opened on the 11th of December; the D.D.M.S., realising the success of the venture, determined to extend the course to 11 days, and it was confidently anticipated that nearly all the junior officers of the three divisions would have passed through the school by the end of the winter. Meanwhile the Second Army had on the 2nd December, opened a school of sanitation at Hazebrouck, the course lasting five days. The school had its origin at a conference of D.A.D.M.S.'s and Sanitary Section Commanders called in Baillieul during November by Captain Copelands, D.A.D.M.S., Sanitary, of the Second Army. It was pointed out at the conference that uniformity of sanitary effort could be realised only by uniformity of training, and it was suggested that N.C.O.'s in charge Regimental Sanitary Detachments should receive instruction at a central school, and that R.M.O.'s should be given demonstrations in improved sanitary appliances and methods. Ultimately the Second Army School of Sanitation opened; each session had a duration of five days; a mess and billets were provided for the class at the Hotel du Faucon at Hazebrouck; the cost of messing was 19 francs for the five days. Captain Copelands was commandant of this school to which two medical officers from each division of the Army were detailed, in turn, to attend. The syllabus included lectures and demonstrations on field sanitation and special demonstrations in the methods adopted for the prevention of infestation by parasites, pediculosis and scabies, including diagnostic methods. The school was very popular, as apart from the valuable instruction afforded, it made a very pleasant break in the dreary round of duties of the R.M.O.

In January Lieut.-Col. Murray, D.S.O., relieved Lieut.-Col. Irvine as Commandant of the Anzac Medical Officers School, the latter taking up duties as Acting A.D.M.S. of the 34th Division. The building appropriated was in many ways well adapted to the purposes of the school. It was a modern Flemish house and had modern appliances, electric light and central heating, it made a very comfortable home for the mess and such students as could be billetted there. The course had been extended to 11 days and

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with experience the syllabus of lectures had been much improved, partly by means of appreciations written by the students; the answers given to the papers set showed clearly that the knowledge imparted in the lectures and demonstrations had been well assimilated. Each paper had a final question: "State what you think of the course and how it could be improved." The answers to this question were a valuable guide to the directors. In most instances the lectures were given by staff officers, each an expert in his subject. The services of senior administrative officers of the allied divisions and the Corps staff were available and, in some instances, of attached specialists; many of the lectures were of compelling interest, dealing as they did with the most recent thought on war injuries and diseases of topical importance; such as:—trench fever, trench nephritis, shell shock, the treatment of the wounded and the effects of poison gas. A small library of official manuals provided by the N.Z.E.F. was placed at the disposal of each student; but there was little time for close study, the duration of the course was too limited and the five hours devoted to lectures and demonstrations seemed to most students—and it probably was—sufficient mental effort for one day. Much added knowledge was gained by conversation and exchange of ideas after class hours, the commandant always willing to assist in these informal discussions. If the syllabus had any fault it was in the direction of over fulness; the wealth of information provided could not be wholly assimilated, in some instances, in the time allowed. There was naturally some overlapping in the lectures, which was not disadvantageous but rather helpful, as it served to impress on the class those points which seemed to several lecturers of paramount importance. Whatever the method adopted, there can be no doubt of the value of such a course of instruction; the quickening spirit of the field was an adjunct that helped both teacher and pupil to attain their ends and eschew academic speculations of no practical purport, and as such, to be eliminated; the added stimulus of emulation was provided by the examination and the fact that all papers were forwarded to the D.D.M.S. for perusal at the termination of the course. In the appendix will be found a typical syllabus and examination paper demonstrating the great complexity of subjects with which the medical services had to make themselves familiar at this period of the Great War, many of them subjects not taught in any existing manual in use in the medical services nor in the schools of instruction at the home bases.

The Second Army classes in sanitation at Hazebrouck continued during the winter, some medical officers passed direct from the

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Corps training school to the Army school, their curriculum being continuous and lasting 16 to 17 days—a very grateful rest for an R.M.O. At Hazebrouck excellent demonstrations were given on the diagnosis of scabies at the 12th C.C.S.; the famous Second Army School of Cookery was also visited, beside various experimental sanitary areas. The Second Army had also a medical society—but very unlike our primitive institute at Anzac—the meetings were held fortnightly at various C.C.S.'s and were addressed by the foremost medical specialists. An ambulance car left the A.D.M.S.'s office at Sailly on the days appointed, to take any medical officers of the division, who could be spared, to attend the meeting. Thus it was that the medical corps were now participating in the opportunities for higher training made available to all officers of the B.E.F. in the winter of 1916-1917, during which "the Army became a Staff College."

A divisional school of instruction in field sanitation was opened on the 8th January, 1917, at which the sanitary detachments of units, as laid down in war establishments, attended for a period of five days. The syllabus covered the whole of the duties of the sanitary personnel of field units detailed in Field Service Regulations, part 2, section 84, with added matter of contemporary importance. The hours of daylight were spent in outdoor demonstrations and practical work, the remainder of the day in lectures indoors. The working hours were from 9 a.m. to 5 p.m. with an hour's break for dinner. Two lectures were given in the late afternoon, each of 40 minutes duration, illustrated by coloured diagrams and models prepared by the Sanitary Section who had charge of the school. The regimental medical officers reported favourably on the improvement in the general interest shown in their work by sanitary men, in consequence of this course of instruction.

An inquiry into the work of the regimental chiropodists trained at the divisional school at Armentières showed that in the majority of cases the chiropodists were well trained and efficient. regimental medical officers were unanimous in agreeing that the work had been most valuable to the battalions on the marches to and from the Somme, and that in most instances the chiropodists were keen and skilful. As evidence of the necessity of constant attention to the condition of the infantryman's foot, it was noted that in one week ending September 9th, 1916, no less than 45 cases were evacuated to C.C.S. from the division on account of injuries to the feet from marching. The total evacuations during that week numbered 248 so that the loss due to

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preventable foot troubles was about one-fifth of the total evacuations and more than four times greater than any other single cause of disablement. The battalions who had the best chiropodists had least foot trouble. There had been casualties amongst these specialists, some had been killed, as they were obliged to carry out all the usual duties of a soldier. They were not in receipt of any extra pay as in the British Army; their work was purely voluntary and in no way absolved them from other duties in the trenches. This was an anomaly which could not be allowed to continue in justice to the chiropodist and his work. Neither extra pay nor promotion to the rank of corporal could be provided for under existing regulations. It was not economic to train men for special duties which they were debarred from carrying out except in their leisure time, and with no extra remuneration. Repeated losses by battle casualty of the trained chiropodists employed on other work than their speciality was to be avoided if possible. The problem of trench foot prophylaxis with its elaboration of preventive details was now demanding much attention. For these reasons, the second session of the divisional school of chiropody opened at No. 3 New Zealand Field Ambulance, Estaires, on the 12th December. Major Guthrie, M.C., was again in charge. The class was billetted and rationed by No. 3 Field Ambulance, four senior chiropodists were detailed to act as assistant instructors, and two N.Z.M.C. nursing orderlies from each field ambulance were attached for training. In every instance the N.Z.M.C. nursing orderlies showed marked aptitude for the work and later on were of very material assistance in dealing with foot trouble in men admitted to the ambulances. The syllabus of lectures was comprehensive and laid special stress on the necessity for rigid antiseptic measures. There was no dearth of clinical material, as R.M.O.'s were instructed to send all cases in need of treatment to the class on special days. The supply of men with the necessary goodwill, education and ability to make efficient chiropodists is probably very limited in a division. As a consequence only a small proportion of the candidates at this course attained sufficient proficiency to satisfy the examining officers; but, by a routine order published by the New Zealand Division, a status was provided for the battalion chiropodist, his duties defined, and he became a whole time member of the regimental medical detachment. Some such arrangement had in some cases been arrived at in the battalions by making the chiropodist act as corporal medical orderly; an unsatisfactory solution as no one N.C.O. could perform both duties. There is a

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clear indication for a permanent establishment of battalion chiropodists with the rank of corporal, and possibly a senior chiropodist with the rank of sergeant attached to brigades. An alternative would be to provide battalions with trained chiropodists from the personnel of Field Ambulances.

The winter of 1916-1917 will be memorable in Flanders on account of its severity; it was very wet and cold until the end of December; the new year opened with a fall of snow and an unusually severe spell of hard frost when temperatures lower than ever experienced since 1882 were recorded. Curiously, the intense cold snap at midwinter did not affect the health of the troops prejudicially, on the contrary, there was a decrease in the sick rate during the month of January, 1917, the average for the division being 5.43 per 1000 per week, a little more than the army rate. In the early part of the winter Vincent's angina was noticeably prevalent, but with the onset of hard weather the wastage by diseases of the respiratory system took a leading place; an unusual type of influenza with, in some instances, severe broncho-pneumonia as a complication caused many casualties. There was little doubt now, that the New Zealand troops were very prone to these respiratory infections, much more so than British troops—it was even said that the New Zealanders provided the whole of the pneumonia of the Second Army during this period. There could be only one explanation of the constantly recurring fatalities in New Zealand troops from this cause which had been recorded during the Maori Wars; in the South African War; in the camps in New Zealand; in Egypt; and again in France; the cause:—clearly a lowered or absent immunity to special types of the pneumoccus, an immunity which British troops, coming from a more densely populated country, had acquired in childhood.

Trench foot, owing to its prevalence, had become a notifiable disease in the Army. It had been a very formidable source of wastage to the British Army in 1914: up to January 24th, 1915, it was stated by Mr. Tennant in the House, that there had been 9175 cases of frost bite, but Lord French, in his "1914," estimates that there were 20,000 cases in all, and cites the example of one brigade which sustained casualties to the extent of 700 in four days. French observers in 1916 were inclined to believe that the causative factor was infection by a mycelium which had been isolated by Professor Vuillemin, but there seemed to be a consensus of opinion amongst the English authorities, following the experiments of Lorrain Smith, that cold and wet with congestion of the limb in the dependent position due to pressure of the puttee

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were the principal causes. Curiously the New Zealand Stationary Hospital reported about this time that they had had marked success in the treatment of cases by the camphor and borax method advised by the French authorities; but in the New Zealand Division the usual army precautions were in force. The use of thigh boots of rubber, the application of whale oil to the feet, and the daily issue of fresh socks to the men in the front line trenches, with the provision of hot food at night, seemed to keep the disease in check. Our only serious outbreak, strange to relate, took place in the Divisional Train in men who were never employed in the trenches—drivers and loaders mainly. It was shown that these men were obliged to work in very wet and muddy horse lines, that their boots were defective, and that they had neglected to use whale oil. In his report on the cases the R.M.O., Captain G. H. Robertson, N.Z.M.C., noted that the circulation in the feet of the drivers and loaders was impaired by the pressure of the seat on the back of the thighs—they had all noticed numbness of the feet early in the day—and he also observed that the horses of the same company suffered from a severe foot infection at the same time. Provision was made for improving the horse standings in this company, and a proportion of rubber boots was issued to the men likely to be affected. On the whole trench foot did not trouble the division to any extent; injuries to the feet in marching were just as frequent a cause of disability. The very elaborate precautions taken by the division included the provision of drying and changing rooms close to the trenches, and the establishment of company kitchens in the support trenches, where hot food in special containers could be sent up at night to front line troops, and three good hot meals per day were provided.

Another war disease from which the division suffered slightly was trench nephritis. Although there was a very slight increase in the general rate of incidence during the winter months, in all some 20 cases diagnosed nephritis had been evacuated in a period of four months. The condition was attracting considerable attention in the Second Army at this time and the disease was notifiable. As a war disease it had been first observed in the American War of the Rebellion in March, 1862, when it assumed epidemic proportion after a prolonged period of trench warfare. About March, 1915, the incidence of acute nephritis became noticeable amongst the British troops in France. Much investigation followed at St. Bartholomew's Hospital, where a special team made an exhaustive study of the disease without much light

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thrown on the etiology. The incidence in the New Zealand Division was much less in January and February 1917, than in the British Armies, where the disease was much in evidence. Investigations carried out in the D.R.S. on all cases admitted in December and January, namely, 1136, showed that, on routine examination of the urine, only three per cent. of albuminuria was detected. This low incidence in the New Zealand soldiers of "transient albuminuria" was in very marked contrast to the figure arrived at by Captain Dixon, M.C., R.A.M.C., who reported in the examination of 4,085 sick in his field ambulance in three months, December, 1916, to February, 1917, no less than 21 per cent. of albuminuria in the absence of any other signs of renal disease.* McLean's observations on 50,000 healthy soldiers showed that there was some five per cent. of albuminuria, confirming the findings of McLeod and Ameuille, who found 4.75 per cent of albuminuria in British troops returning from a spell in the trenches, whereas the proportion in French troops was 1.6 per cent. On these and other findings the last named observers built up a theory of etiology based on a lowering of kidney tissue resistance by a slightly scorbutic tendency and excessive metabolic effort due to high protein feeding.†

In view of this theory and the fact that Indian troops—the greater part non-meat-eating—were immune, the lessened incidence in New Zealanders and the suggestion of a lower rate of transient albuminuria might be attributed to the fact that our troops were habituated to a higher protein value in their domestic ration, and consequently demanded a higher meat ration than British troops. But this is highly contentious ground; more especially as to the scorbutic condition, if it existed.

By December the Division was settling down to make the best of its quarters in the villages by the Lys, many schemes were in hand to give added comforts to the billets, to improve the cooking of the company kitchens; to provide recreation for the resting troops. General Sir Andrew Russell was above all a great fighting general, but he had a very keen eye to interior economy as well. In this he was ably assisted by Lieut.-Col. Reid, A.S.C., the A.A. and Q.M.G., an accomplished "regular" soldier, with an unusual capacity for organising. With this officer the relations of the A.D.M.S. and the medical service of the Division were always happy. Both by the Divisional Commander and the "A" branch the recommendations of the A.D.M.S. invariably received earnest consideration and powerful execution. The need of the moment seemed to be expressed in one word:

* Lancet, June 23rd, 1917. † Lancet, September, 1916.

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"Rest." Our men were restless, overactive, and when in billets, away from the line, were prone to wander in search of distraction and to lack repose. Uncomfortable surroundings, monotonous cooking, little means of recreation were the chief causes of this restlessness. The first need seemed to be improvement in the messing—well fed men would presumably rest better, and be more contented.

A memorandum—"Hints on Cooking in the Field," had been issued by G.H.Q. and was distributed to all units in the Division. The matter was being pressed upon the notice of unit commanders. Lack of adequate training in army cooking was evident, but was destined to be remedied later on by the Army School of Cooking at Hazebrouck. The betterment of the regimental kitchens was a matter which General Russell and Lieut.-Col. Reid saw to personally. They were determined to make an end of the damnable monotony of the eternal stew; their enthusiasm spread to the regimental commanders, much improvement in the messing arrangements followed. Regimental messing funds were established so that the army rations could be supplemented and a greater variety provided, in order that the men should be fed as well as all circumstances permitted.

Our heavy losses in experienced company officers at the Somme explained part of our difficulties in interior economy. Without good company officers no divisional sanitary or economic instructions could bear fruit. Billets unquestionably afforded poor comfort, owing to lack of light and fuel, and were not conducive to rest or contentment. Many of the buildings had been damaged by shell fire or other causes: wear and tear of war conditions; continued coming and going of troops. The billets in forward areas were mainly barns or lofts, often dark and impossible to heat; many of them draughty and in a tumble-down condition. The proprietors, willing enough—so they said—to effectuate repairs, complained of lack of material; while the troops, at present too much occupied with the defence system, had no time to attend to their own comfort. In the villages the billets were somewhat better—factories, schools and so forth, but proving of little attraction to the men. The inevitable alternative was the village estaminet. Ultimately by using our own N.Z.E. stores and by co-operating with the proprietors, who found some labour, the leaking roofs were repaired and the draughty walls made weather proof—straw, woven into mats, provided some mitigation of the hardness and coldness of billet floors; arrangements were made when possible for heating and lighting the billets and in this

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way making them somewhat more homelike. Much more could be done by administrative or technical troops in this respect than by the Infantry.

A large well stocked canteen, a barber's shop, and a watch repairing depot were established: all run by details from the division. The Y.M.C.A. had an institute in the main street with a cinema, but as a larger place of entertainment was required, a theatre was built by our Pioneers called the Kapai Theatre, with a façade reminiscent of a large Maori whare, and accommodation for 1000 spectators seated on rude benches. On the stage of this theatre a variety of talent gave nightly entertainment in conjunction with the Divisional Cinematograph. Amongst the more important engagements were: Lena Ashwell parties; the famous "Bow Bells" troupe of the 56th Division; the Band of the Royal Engineers; and later our own Divisional Pierrots, which the 3rd New Zealand Field Ambulance was chiefly responsible for organising, and to which they furnished, from their personnel, nearly all the orchestra with their instruments, and some of the chief performers, Lt.-Col. Hardie Neil, N.Z.M.C. acting as impressario,—another example of the various strange duties imposed on medical officers by the exigencies of the times. An officers' club was established and provided a warm, comfortable ante-room and writing room for such officers as could not get over to the Second Army Officers' Club at Baillieul, to which a special omnibus ran twice weekly at appointed hours. In this way some attempt was made to organise the amenities of normal existence and towards the end of the year there were ample facilities for recreation, and an ordered social life for those who were out of the trenches, the moral and sanitary value of which was of primal importance.

The first Christmas day of the New Zealand troops in France was observed as a holiday, as far as trench warfare permitted. Ceremonial visits were paid by the A.D.M.S. to the field ambulances and the D.R.S. where 150 patients were comfortably housed. General Godley visited them at dinner time—the rude tables spread with Christmas cheer—his remark was short but emphatic: "You have done 'em uncommon well, Murray." There was a glorious Christmas tree in the afternoon in the divisional theatre for the children of Sailly and Bac St. Maur, which General Russell with important French officials attended, to receive the thanks of delighted guests in an wonderful speech delivered by one of the little girls. There was a reunion of the N.Z.M.C. officers who were not on duty at the billets of the No. 1 Field Ambulance, attended by the D.D.M.S., Colonel Begg: the second Christmas dinner of

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N.Z.M.C. officers at which he presided. Peace and goodwill and frugal carousal was in every billet that night. Even in the trenches, all was quiet in No Man's Land; except that our artillery, the only disturbers of the peace, with the trench mortars and the machine guns fired a substantial amount of hate into the enemy's communicating trenches. The enemy made no reply. We had one man killed and seven wounded that Xmas Day.

The Germans had bottled up their wrath and on New Year's Day, in return for our Christmas boxes they sent over a sprinkling of shells aimed at our front line system without causing any damage or any casulaties. We had our revenge on the 7th January, when the 2nd Battalion of the Rifles entered his lines before dawn, killing many of the 65th Prussian Infantry and bringing back 19 prisoners with the loss of 1 killed and 5 wounded. The weather now became arctic, hard frosts and heavy snow compelled a partial truce. The Lys was completely frozen over; any that could obtain skates made use of them; even the Prussians could be seen holding skating parties which our artillery rudely dispersed. On the night of the 3rd February, retaliation came unexpectedly in the form of gas shells. On a clear moonlit night our forward billets at Fleurbaix were shelled with a mixture of phosgene and high explosive, and the right brigade, the N.Z.R.B. had their front and support line freely plastered with 75 m.m. gas shells fired from trench mortars. Either the men did not realise that gas was being used or there was delay in rousing the sleepers, or in some instances the expiratory valves of the small box respirators, previously in use during the night—there were two separate bombardments—were found to be frozen together; all these and other causes, the combination of H.E. with the gas shells, led to a large number of casualties by gassing. The ill effects of the gas were not, at first, noticed, there was much movement owing to the dispersal of the sleeping men; it was late before the matter was reported, and many of the gassed men had walked considerable distances before they were received into the ambulances. 14 gassed were admitted to No. 1 Field Ambulance and about 20, including 2 officers, to No. 3 Field Ambulance; of these some 5 men died in the dressing station. The most startling feature of the whole occurrence was the fact that the men did not complain of any ill effects for many hours after gassing, and that the onset of grave symptoms, in the fatal cases, was abrupt. The cyanosis, restlessness, dyspnœa and collapse, and ultimate death within a few hours, of young robust men, shocked the medical officers in attendance in this their

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first experience of the extraordinary lethal effects of phosgene in high concentration. The treatment adopted was that laid down in the manuals—oxygen, camphor, and atropine. Only those who have struggled hour after hour with a fatal case realise how futile these remedies were. The value of continuous oxygen administration in the milder cases was manifest, but the necessity for a suitable apparatus with a closed face-piece was also obvious; the need of a liberal supply of oxygen in field ambulances was now fully realised by all; and for some time after the ingenuity of N.Z.M.C. officers had full play in devising apparatus for continuous inhalation which could be constructed from material normally available. The precautions taken in December by the division to revise anti-gas defences and the elaborate training carried out at the Divisional Gas School with the new small box respirators which replaced the helmet, had been dictated by the Army, who were, by their Intelligence warned betimes of the forthcoming menace of phosgene gas shells. Up to this time the use of lethal gas in shells, initiated by the enemy at the Somme, had not been very extensive. The year 1917 saw a very marked change. Stringent regulations, designed in part by the A.D.M.S. were now enforced so as to avoid the future possibility of delay in reporting and treating cases of gassing. All troops who had been exposed to gas were to be relieved at once, and any showing even the mildest symptoms were to be treated urgently as stretcher cases. All those who had been in the gassed area were enjoined to rest quietly for some hours afterwards. The net result of this, our first baptism of lethal gas was an earnest renewal of instruction in gas defences and gas drill with strict supervision of all anti-gas measures, preventive as well as therapeutic.

Our final revenge in the Sailly sector eventuated on the 21st February, when the 2nd Auckland Battalion: 18 officers and 500 men raided the opposing lines under a heavy barrage; the enemy were caught at 'stand to" and lost about 200, including 44 prisoners brought in by us. No. 1 Field Ambulance received 97 of ours and 13 German wounded from this raid. The methods adopted in this operation—for which the ambulance was duly warned—were as follows:—The A.D.S. personnel was pushed forward to form a collecting post and an extra number of bearers were sent to the bearer relay posts and regimental aid posts. Communication was kept up by a motor cyclist between the collecting post and the original A.D.S.; extra ambulance waggons were brought up to the nearest point on a road where wounded might be loaded and communication between the car station

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and the collecting station established by telephone and the car orderlies. Lying cases were despatched direct to the M.D.S. from the collecting post, where hot drinks, extra blankets and stretchers were made available. The A.D.S. became an administrative post only, keeping in touch with brigade headquarters and the M.D.S. All wounded were cleared by noon.

On the 25th February the N.Z. Division gave over command of the Sailly sector to the 57th Division at 12 noon, our medical units handing over to Wessex and West Lancashire Territorial Field Ambulances, at the same time relieving the medical units of the 25th Division. The A.D.M.S. reopened his office at Steenwerck; the Divisional Headquarters of our new sector: Le Touquet-Ploegsteert.

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CHAPTER XI.

At the Bases in 1916.

It was not without well directed effort and whole hearted enthusiasm that New Zealand had succeeded in recruiting, training and embarking some 30,000 men during the year 1916, a force equivalent to the whole of her peace time Territorial Force; in all, there had been despatched overseas some 60,898 men by the end of this year and there remained on the strength of the N.Z.E.F. at the end of December, 1916, 47,114 men with the division in France, with the mounted brigade group in Sinai, or at the bases in Egypt, England and France.

In New Zealand recruiting, still on a voluntary basis, had been sufficient to mobilise over 75,000 troops, that is to say, 7 per cent. of the total population.* The territorial camps were well attended and in every case a sufficiency of medical officers had been available for that service. Some of the territorial field ambulances went into camp at the N.Z.M.C. Depot where a high standard of efficiency was maintained. There were now four standing camps for the training of the overseas drafts: one near Auckland at Narrow Neck, average strength 300; three in the Wellington Military District—Trentham, average strength, 4000; Featherston, 4000; and Awapuni 300. A total of 46,390 troops had passed through these camps in 1916, the average total population being 11,772. In the annual report furnished by the D.G.M.S. it is shown that the general health of the camps was about comparable to that of the British Army in England in peace time, with an average rate of 20 per 1000 per annum constantly sick. There were 12,048 admissions to hospital during the year with an average of 19.59 per 1000 constantly sick, while the death rate was 7.8 per 1000 per annum. The prevailing diseases, mainly encountered during the winter and spring, had been influenza, measles, pneumonia, and cerebro-spinal meningitis. After one outbreak of febrile catarrh, and later measles, cerebro-spinal fever reappeared in midwinter—July, 1916—in the two principal camps, it became epidemic in August and died out gradually in the summer months. In all 51 cases with 36 deaths were recorded. Associated with

*The European population of New Zealand in 1916, was 1,099,044; men of military age: 243,376.

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the cerebro-spinal meningitis were cases of a peculiarly fatal form of pneumonia, a "septic" broncho-pneumonia associated with measles; there were 50 cases with 35 deaths, a mortality of 70 per cent. True lobar pneumonia, running a much milder course had been observed earlier in the year, but not in any greater numbers than would be the normal rate for the population, it seemed to be quite distinct in its distribution and seasonal incidence from the "septic" type. In a report on the winter epidemic, Lieut.-Col. Makgill, N.Z.M.C., A.D.M.S. (sanitary), draws attention to the extraordinary relationship of Meningococcal infection to the septic pneumonia.* There seemed to be sufficient evidence of identity of the infecting agents in the two diseases to warrant their classification together under the term "meningococcal infections," based on the distribution in camps, the same variations in age incidence, the coincidence of the period of maximal intensity and particular evidence of infections of both types, pneumonic and meningococcal in individuals associated and in contacts. The evidence based on epidemiological grounds was further backed by bacteriological findings in as much as both Professor Champtaloup in Dunedin and Major Hurley, N.Z.M.C., in Wellington, had isolated the meningococcus from the sputa of fatal cases of septic pneumonia. What part the *Streptococcus haemolyticus*—later shown to be an active agent in the purulent bronchitis of New Zealand troops in England—was playing in this epidemic, does not appear clearly from the documents, but several facts emerge from contemporary descriptions of the disease which suggest strongly that the septic pneumonias of Trentham and Featherston in 1916, were one and the same disease as the very fatal purulent bronchitis of 1917 and 1918. From reports furnished by medical officers it is agreed that the disease was of sudden onset, that it was associated with a rash, petechial or haemorrhagic in character, that there was intense purulent discharge from the naso-pharynx and a very high temperature reading, that a peculiar lividity was noticed early in the disease described as "a typical blue earthly look not like cyanosis"; that the lung condition resembled rather a capillary bronchitis than a lobar pneumonia; that the sputum was purulent and offensive in odour, and that it yielded on bacteriological examination an abundance of *streptococci*, whereas *pneumococci* were scantily present. We shall have occasion to refer to this perplexing problem at a later period as it presented itself in the camps on Salisbury Plain in late 1917 and 1918. One almost inexplicable factor in con-

* Meningococcal infection in military camps during 1916. App. Parliamentary papers H. 19 J. Vol. II., 1917.

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nection with these epidemics in New Zealand is the agreement of observers in Trentham and Featherston that the measles epidemic was "true English measles," whereas the infection in the New Zealand base at Etaples in 1916, and the extensive outbreak in the division in Armentières—May and June—was definitely Rötheln, not Morbilli, and was of a very mild character. Further it was clear that the infection had come with the reinforcements and the 3rd and 4th Battalions of the Rifle Brigade. The causes which precipitated these virulent outbreaks were admittedly the physiological overcrowding in the camps of a country population born and bred in open empty spaces, not as yet sufficiently leavened, as the townsmen were, by acquired immunities. The measles outbreak was evidence of this as the adults from the backblocks in large numbers contracted the disease on admission to camp. A valuable precaution, dictated by the highly susceptible condition of the recruits, was now enforced. A reception and isolation camp was formed at Tauherenikau near Featherston, where all the drafts coming in from the military districts were admitted and here the recruits lived in tents during a number of weeks sufficient to cover all periods of incubation; a month at least elapsed before they were permitted to enter the training camp. All the troops were subjected to throat swabbing with cultural investigation of the naso-pharyngeal discharges; carriers of the meningococcus were isolated and treated by chloramine "T" sprays; as were all reinforcements prior to embarkation.* Owing to a shortage of chloramine "T" it became necessary for New Zealand to manufacture the drug from imported materials; this was done by Professor Inglis in his chemical laboratory at the University of Dunedin. By these precautions few cases of C.S.M. developed in the transports which were by now being fitted with inhalation chambers then stated to have a markedly beneficial effect in checking catarrhal conditions.

No fault could be found with the sanitary conditions existing in the camps, as domestic arrangements had by now reached a high level of efficiency, but, as in 1915, the hospital accommodation was still inadequate to meet the emergency in 1916. At the outbreak of the second epidemic the P.M.O. at Trentham had 265 beds available in an assemblage of buildings designated the "Cottage Hospital," with 30 beds, the "Wairarapa" building, 150 beds; the Casualty Ward, 36 beds; Izard Convalescent Home, 50 beds. The various buildings in camp, the Cottage Hospital, the Wairarapa Ward and the Casualty Ward, constituted the Trentham Military

* The carrier rate of these trained men is stated to have been only 5 per thousand just prior to embarkation.

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Hospital, the first military hospital to be established in New Zealand, the evolution of which it may be of interest to recall.

As early as January, 1915, the British Medical Association (New Zealand Branch), were desirous of doing something of a patriotic and practical kind in the national crisis, and with an assurance of substantial pecuniary assistance from the members, met in deputation the G.O.C. and the D.M.S. At this interview it was decided that the sum of money subscribed by the B.M.A., then over a £1000, would be best utilised in improving the accommodation for sick at Trentham Camp, which at this time consisted of a marquee with six or seven beds not provided with bed linen. The matter was referred to the acting Defence Minister, Sir Francis Bell, who approved of the motives of the subscribers. Meanwhile the fund grew and a party of ladies of Wellington district afterwards known as the Ladies' Military Hospital Guild, with Mrs. Luke, Mayoress of Wellington, as President, had offered to find all necessary beds, bedding, and linen for the hospital. After protracted deliberations in which three Government departments and the Minister of Defence were concerned, a contract was let by the 27th of April, for a sum of £2889, to provide a cottage hospital to be known as the Trentham Military Hospital, with accommodation for 18 to 20 beds. Of the inadequacy of this provision for a camp of 7000 men, the public of New Zealand were very soon aware when the first epidemic of cerebro-spinal meningitis broke out in 1915. The hospital was not then completed nor was it available for use until late in September of the same year. There was a good deal of feeling displayed against the Defence Department by certain branches of the British Medical Association about the delay in providing even the small hospital, the cost of which had been borne to a great extent by their subscriptions, in some instances individually very generous.* The epidemic provided the discontented people with a weapon to assail the Minister, who by the Statute was obliged to assume a single handed responsibility for all details of defence administration, not normally within the capacity of one man wholly to compass in war time, and which the Minister could not delegate to his subordinates.

The Trentham Commissioners report had found that as no provision had been made in advance for hospital accommodation at the camp, there was consequent overcrowding during the 1915 epidemic, and a disorganisation which was to the prejudice of the patients and as the result of this, late in 1915, another ward was built, a large octagonal open sided pavilion giving accommodation

* The late Major Savage, N.Z.M.C., of Auckland, subscribed £500.

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for 100 beds, a building designed as an open air ward after the pattern of a large tea kiosk on the Trentham Race Course, the plans of which were sketched by the Public Health Department, the necessary funds for building being supplied to a very large extent by donors living in the Wairarapa District; hence the name "Wairarapa" ward. The convalescent home called "Izards" was a country house at the Upper Hutt, some 2½ miles away, generously put at the disposal of the camp by the Hon. Chas. Izard, M.L.C.

The staff commanded in 1916 by the P.M.O., Lieut.-Col. Andrew, N.Z.M.C., an establishment calculated on a basis of 200 beds, was: 7 officers, one dental officer, 1 Q.M., 5 N.Z.A.N.S., 68 N.C.O.'s and O.R. N.Z.M.C. At the beginning of the year the D.G.M.S. had arranged that men rejected from the reinforcements might be recruited to the N.Z.M.C., Home Service Section, and had also provided for their training at the depot at Awapuni and the usual examination for promotion. Frequent changes in the service owing to men transferring to other units and to drafts to the hospital ships was a cause of some lack of efficiency in the Trentham detachments, although from what may be gathered, the work, generally, was considered to be satisfactory. On the outbreak of the second epidemic, when the admissions to hospital amounted to over 800 for the month of July, further accommodation was required and the tea kiosk at the race course again came into use by the courtesy of the Racing Club, who were already finding accommodation for the medical officers and nursing staff, N.Z.A.N.S., in the trainer's quarters on the race course. Of the efficient and painstaking work of the whole medical staff during this trying period, there is ample evidence.

At the instance of the Minister of Health, at this time, the Hon. G. W. Russell, a Committee of Inquiry was set up late in August, 1916, to report on the conditions affecting the health of the troops at Trentham. The committee presided over by Dr. T. A. Valintine, Chief Health Officer for the Dominion, included Surgeon General Henderson, and Lieut.-Col. Andrew, representing the Defence Department. It was found by the Committee that the sickness rate in camp was highest in those who had spent least time in camp and that the drafts nearing completion showed a more seasoned or less susceptible condition; or that men in the final stages of training were less liable to disease than recruits. 60 per cent. of the deaths were in men who came from the country districts; the country men suffered most as being most susceptible to measles, which seemed to predispose to both C.S.M. and pneumonia. No sanitary defects were found. The

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provision of adequate drying rooms for clothing, hot shower baths, and well ventilated and not overcrowded huts with good drainage, faultless conservancy and an excellent dietary, gave assurance that internal sanitary conditions had no bearing on the disease. The Committee found that increased hospital accommodation was desirable, as there was evidence of cross infection in the crowded wards, for which reason they advised that new isolation blocks be provided so as to permit of segregation of the various types of infection, viz: measles, influenza, pneumonia and C.S.M. Further the Committee recommended the teaching of the elements of hygiene to the company officers and lectures to the men with the same object in view. The Committee expressed their admiration for the self-sacrificing work done by the medical staff.

It may appear from the above recital that there was a lack of forceful medical administration in 1916. As yet the D.G.M.S. was not permitted fully to control his department. We have seen that sanitation and military hospital administration were a function of the Public Health Department. That the question of hospital accommodation at Trentham was a matter not directly under the control of the D.G.M.S., although he certainly administered the personnel of the hospital. Further, we find the Minister of Public Health setting up a committee to investigate sanitary conditions in the Trentham Camp, a committee consisting of the very officers of the Health Department who were personally responsible for sanitary direction. The absence of any fully constituted General Staff, and the one man control of what represented the War Office, namely, the Department of Defence, to whom the G.O.C. and his staff were to a great extent subordinated, that and the dual control of medical arrangements could not make for smooth running and efficiency. The succeeding epidemics in the camps served to emphasise this lack of co-ordination in medical administration, which was inevitable under the conditions, but which, however disconcerting, was not in any way aggravated by lack of sympathetic understanding between the various parties concerned. As there were no N.Z.E. constructional services in New Zealand, both the Public Works Department and the General Manager of Railways, were concerned with the small matter of the cottage hospital at Trentham which became so complex a problem as to demand the attention of no less than three ministers, one important department and the Cabinet; a condition vividly recalling the difficulties of the medical services in England in the winter of 1854 during the Crimean

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crisis. The good ship "Medical Administration," storm tossed on perilous seas, had too many strong hands at the wheel.

The medical arrangements made for the classification and disposal of invalids returning to New Zealand were complex; but above all extraordinarily sympathetic and humane. On the arrival of a transport or hospital ship, and prior to disembarkation, the invalids were inspected by a medical board consisting of a representative of the D.M.S., generally the local A.D.M.S, and a representative of the D.M.H., local health officer, holding honorary military rank, and the medical staff of the ship. The invalids were classified under the following heads:—

(a) Invalids requiring immediate hospital treatment;
(b) Convalescents for treatment at Hospitals or Convalescent Homes;
(c) Convalescents fit to proceed to own homes;
(d) Men returned invalided, but now fit for duty;
(e) Any other category such as:—permanently unfit but not requiring hospital treatment.

The classes (a) and (b) came immediately under control of the Minister of Health; the classes (c) and (d) under the D.G.M.S., whereas the last category (e) passed into the control of the Repatriation Department and, or, the Pensions Department. Railway passes were provided to the port of disembarkation for the next of kin in every instance; and the transport of the stretcher or walking cases was undertaken by the St. John Ambulance Societies and the New Zealand Motor Service Corps, a volunteer military formation. Ambulance trains were in waiting and on these trains the next of kin of the more serious cases were often allowed to travel. Both cot cases and convalescents for hospital were transferred to the nearest public hospital in their own district so as to be close to their homes; and in the case of convalescents granted sick leave. Facilities were provided for medical treatment, where required, by the local territorial N.Z.M.C. officers with certain restrictions as to duration of treatment imposed by the D.G.M.S. and supervised by the A.D.M.S. of the military district, who, in the case of further hospital treatment being required, boarded the patient and handed him over to the Public Health Authorities. The D.M.H. now made all necessary arrangements except the issue of railway warrants, a function of the O.C. district in all cases of transfer. The average cost of maintenance in public hospitals was 5/- per diem which was charged to the Defence Department.

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The early history of one of the chief military hospitals, King George V. Hospital, is associated with a period in 1916 during which the Rotorua Sanatorium, a balneological station in the hot lakes district under the control of the Tourist Department and provided with a medical superintendent, became a convalescent depot for returned invalids of the Auckland District. For reasons of discipline it was early found that some military control should be exercised at this depot. The Superintendent, Dr. Herbert, was therefore given military rank as Hon. Major N.Z.M.C., a combatant officer, Colonel Newall, and some N.C.O.'s and details, in all 20 N.Z.M.C. were posted to the Sanatorium early in 1916. There was then a total of 150 beds available and a new polygonal block had been erected at Pukeroa Hill, which became the nucleus of King George V. Hospital, of which Colonel Newall was first commandant.

At Hanmer, also a Tourist Department Sanatorium in the vicinity of hot mineral springs in the South Island, somewhat similar arrangements existed. And at Lowry Bay in Wellington Harbour, a fine house lent by Sir Francis Bell, Attorney General, was used as a convalescent home, controlled by the Red Cross Society.

The importance of an efficient dental service for war had been recognised in New Zealand from the outbreak of hostilities,—dentists, as we have seen, were attached to the Samoan Force, the Main Body and the reinforcements. The Dental Sections with the Division had been organised by the Dental Administrative Officer now on N.Z.E.F. Headquarters. Dental work in the camps in New Zealand had increased enormously; large numbers of recruits were still being rejected by reason of dental defects, which meant a serious loss of man power. Recognising that no recruit should be refused for dental defect only and also that it was necessary to supply dental officers to the N.Z.E.F. at the base and overseas, the New Zealand Dental Association, in June, 1915, made a patriotic offer to the Government to treat all recruits gratuitously as far as time permitted, a charge for material only being made. This offer was accepted and for two years the dentists of New Zealand continued to give this valuable service. Dr. H. P. Pickerill, M.D.,[1] who held the Chair of Dentistry at the New Zealand University Medical School in Dunedin, and Mr. T. A. Hunter, a prominent dental surgeon, were requested, in 1915, to furnish a report on the dental treatment provided for recruits in camps of training.[2] And shortly

1 Afterwards known for plastic surgery of the jaw at Queen's Hospital (New Zealand section), Sidcup.

2 This at the instance of the Defence Minister who was instrumental in founding the N.Z.D.C.

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after the arrival of Surgeon-General Henderson, a Dental Corps was devised which came into being at the end of 1915. The corps consisted of: administrative officers; executive officers who with the mechanics formed the base clinics; the Dental Sections with the N.Z.E.F. units overseas; and lastly, civilian dental surgeons employed in military districts in so treating the dental defects of recruits as to make them dentally fit before going into camp, and in looking after returned soldiers. In all this work the Dental Association gave willing help. Mr. T. A. Hunter became Director of Dental Services on Headquarters at Wellington, and under his energetic administration the reinforcement camps were supplied with large dental clinics staffed with a liberal number of N.Z.D.C. officers, N.C.O mechanics and O.R. who were able to ensure that all drafts leaving were dentally fit. The work included dental prophylaxis and a vigorous propaganda, a moral tooth brush drill, which had a wide effect in keeping the men alive to the importance of oral cleanliness.

I have said that recruiting, even in 1916, was on a voluntary basis, but in August, 1916, the National Government of New Zealand, on account of the prolonged nature of the war and in order to avoid any possible delay in the regular despatch of reinforcements, decided to pass legislation providing for compulsory service.* The Military Service Act, 1916, provided for the formation and registration of a general reserve of all valid men natural born British subjects, between the ages of 20 and 46 years; but it was not until the very end of 1916 that the first draft of men drawn in the Ballot was called up. For the purposes of medical examination of recruits four medical boards of three officers each were constituted.

Of the base in Egypt in 1916, there is not much to be said: at present it consisted of a small camp at Moascar with a medical officer and an officer of the dental corps, and served the Mounted Brigade Group then in Sinai. There was a New Zealand Convalescent Home at Heliopolis, the Aotea Home; there were no other medical units than the Mounted Field Ambulance. The medical operations of this section of the N.Z.E.F. are dealt with in a separate chapter.

The N.Z.E.F. Base in England had its beginnings at the office of the High Commissioner for New Zealand, Sir Thomas Mackenzie. At first there was an Australian and New Zealand Base at Weymouth, and some of the 3000 sick and wounded in England at the end of 1915, were either in British hospitals or at the

* The Military Service Bill in England, whereby voluntary enlistment was replaced by compulsion, passed the House of Commons in mid May, 1916.

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New Zealand War Contingent Hospital at Walton-on-Thames. But with the move of the division to France, it became necessary to establish a base under military command in England as the conditions there were more favourable for all purposes than in Egypt. Lieut.-Col. (temp.) Brigadier-General C. S. Richardson, C.M.G., N.Z.S.C., then acting as A.A. and Q.M.G. XIIth Corps Salonika, who had previously been the New Zealand Military Representative at the War Office, was appointed Officer-in-charge Administration and Commandant of the New Zealand Base in the United Kingdom. On the 7th April, 1916 there were in England 1,900 officers and men of the N.Z.E.F., of these over 1,800 stated to be category men, distributed in various units of which the most important was the Epsom Convalescent Home, New Zealand Section. There was no N.Z.M.C. Standing Board; all officers and men were classified by R.A.M.C. Boards which, for administrative purposes was unsatisfactory: such categories as "permanent base" or "sedentary occupation," it was not advisable to retain in England for economic reasons, discharge to New Zealand was preferable. The distribution of the categories on 22nd April, 1916, was: in Hospital, officers, 39; O.R. 426: in depots or offices, 39; at Epsom Convalescent Camp, 1,312. The congestion of convalescents was due to the fact that there were large numbers of enteric convalescents who were detained for bacteriological tests. Captain Ritchie, N.Z.M.C. invalided from Gallipoli, was at this time employed on the work initiated by the Medical Research Committee in the London Hospital. All carriers were to be discharged to New Zealand and at this time some 400 were awaiting tests. In order to deal with these invalidings, primarily, Major, (temp.) Lieut.-Col. B. Myers, N.Z.M.C., late officer in charge of Walton Hospital was appointed A.D.M.S. to the base, and permission was granted by the War Office to form a New Zealand Medical Board.

During the month of May the whole of the headquarters units left in Egypt came to London, including the D.D.M.S., Colonel Parkes, N.Z.M.C., and his staff, and set up their officers in Southampton Row. A New Zealand Medical Board was appointed forthwith and negotiations were entered into with the New Zealand War Contingent Association with a view to taking over their hospital at Walton-on-Thames—heretofore a civilian institution controlled by a committee with Lord Plunket as Chairman—which had 350 beds and a present total of 200 patients. This, by the generosity and self-sacrifice of the New Zealand War Contingent Association was ultimately accomplished; and in August, Walton-

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on-Thames Hospital became No. 2 N.Z.G.H. under the command of Lieut.-Col. Mills, N.Z.M.C. Early in 1916, Major D.S. Wylie late of the No. 1 New Zealand Stationary Hospital had been appointed to the command of the N.Z.G.H. at Abasseyeh, vice Lieut.-Col. Parkes, appointed D.D.M.S. The whole unit sailed for England in the N.Z.H.S. *Marama* in June, 1916, disembarking at Southampton, and taking over Lady Hardinge's hutted Hospital, originally built for the use of the Lahore and Meerut Divisions in 1915, at Brockenhurst in the New Forest, about 14 miles from Southampton. The main portion of the establishment was a hutted structure of two wings of 10 wards, each fitted with 36 beds, a central administrative block, and the usual operating theatre, X-ray room, dental surgery, and dispensary. In addition to this section two large hotels in Brockenhurst, already in use as hospitals were taken over: Balmer Lawn Hotel, about one mile from the headquarters having 200 beds, and Forest Park Hotel, with a similar capacity. The scattered distribution of the three sections was not conducive to ease of administration as it meant increasing the staff. From September 1916, the admission rate rapidly rose in sympathy with the Somme operations and in the last four months of the year the admissions averaged over 700 a month; the total admissions for the half year being 3,846, with 1,100 beds available.

At Walton-on-Thames, the accommodation was increased by marquees and a scheme of building which was to provide four hutted wards of 70 beds each; the total beds thus brought up to 1040. A staff was gradually built up from category men amongst the patients; by kindly assistance from the Canadian forces who lent nursing sisters; and by the employment of a large number of V.A.D.'s. Both N.Z.M.C. officers and O.R. reinforcements were at this time urgently required to replace casualties in France. During 1915, the War Contingent Hospital had an average bed state of about 90, but in 1916, after conversion, the average rose to 500.

With the arrival of the training battalions from Egypt, it became necessary to open a new unit for the infantry base: the Commandant, Lt.-Col. Smyth, A.D.C., N.Z.S.C., took over Sling Camp on Salisbury Plain as a reserve group or infantry base training unit. It was also decided to form a command depot for New Zealand troops at Codford. The Imperial Government had early found that a general base depot was unsuited to the requirements of category men, whose training must differ considerably from that of fit men. The British Command Depots were originally medical units under the control of a medical officer; the

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inmates were provided with special treatment, by physico-therapeutic measures, massage, electrical treatment, mechano-therapy, special baths, and graduated physical exercises; the course designed as a stepping stone from convalescent hospital to infantry training depot. Later, these units were commanded by a combatant officer with a senior medical officer assisting. Lt.-Col. Brown, D.S.O., N.Z.S.C., took command at Codford Camp where the New Zealand Command Depot was established. Captain Aubyn, N.Z.M.C., the first S.M.O., was succeeded by Lt.-Col. Pearless, late R.M.O. Canterbury Battalion in Gallipoli. The standing board transferred 467 category men to this camp; the "A" class men, including the dysentery convalescents who had been detained for tests, were sent on to Sling by Army Council instructions.

No. 3 New Zealand General Hospital was formed at Codford by taking over an R.A.M.C. Hospital in the Command Depot, it had some 330 beds available, and by September was partly manned by us: Lt.-Col. P. C. Fenwick, N.Z.M.C. in command with several R.A.M.C. officers temporarily attached by courtesy of the D.G.M.S. A third medical unit to be formed in the United Kingdom in 1916, was the New Zealand Convalescent Hospital in Hornchurch. The Hornchurch depot, under the command of Major T. H. Dawson had been the equivalent of a Command Depot and Infantry Base Training Depot, where there was accommodation for some 500 men, mostly billeted out. It was inadequate to accommodate a convalescent hospital as well. Consequently the Command Depot and Infantry Base Depot were moved as we have seen, and the New Zealand Section of the Convalescent Camp at Epsom was transferred to Hornchurch, which now became the New Zealand Convalescent Hospital; Major T. H. Dawson, a combatant officer commanding, and Major H. Short, N.Z.M.C., as S.M.O. By September the Hornchurch Convalescent Hospital had been refitted and command was taken by Lt.-Col. Tewesley, N.Z.M.C., late of the No. 1 New Zealand Field Ambulance. Electrical fittings and apparatus for physico-therapy had been supplied; the hospital still had attached a V.D. section, and the Discharge Depot. The V.D. section, 167 patients, was in October moved to No. 3 N.Z.G.H. at Codford and Captain Brown, N.Z.M.C. wounded at the Somme took command of the section which he retained until demobilisation.

The formation of three new medical units and the necessity for staffing Sling and Codford was a serious drain on the N.Z.M.C. reinforcements: of the three general hospitals, only one had a full establishment on formation, the others had to remain for a time understaffed with unusual strain on the personnel. This was

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especially felt at Walton-on-Thames; but the lowered rate of wastage in the months following the Somme operations gave these units some respite from work and ultimately all of them were more or less completely staffed with N.Z.M.C. officers, with the exception of the Command Depot where the S.M.O. for some time was very short handed.

The London Headquarters Medical Staff now comprised the D.D.M.S., N.Z.E.F., Colonel Parkes, the A.D.M.S. Base, Lt.-Col. B. Myers, the D.A.D.M.S., Major McKibbin, N.Z.M.C., and the chairman of the Standing Board, Captain Tapper, N.Z.M.C. Their work during the year had been arduous and the arrangements they had completed were satisfactory, except in one matter, probably wholly unavoidable: the scattered distribution of the principal medical units which were not even on one system of railway, but on several. Hornchurch and Walton were sufficiently near London to be administered with some ease, but the other hospitals and the Command Depot were so separated as to be difficult of access and transfer of patients was both costly and tedious. The ideal distribution, possibly, would have been to have had one large general hospital, say of 2000 beds, within easy reach of both the Command Depot and the Infantry Base on the same railway system as the Convalescent Hospital. And as the position of No. 1 New Zealand General Hospital was dictated by the necessity for proximity to Southampton, the principal disembarkation port for wounded and sick from France, theoretically the Convalescent Hospital and the Command Depot would have been better placed in proximity thereto. The administrative difficulties in segregating New Zealand soldiers in the large drafts of evacuations coming over by hospital ship to Southampton must have been very considerable for the D.M.S. embarkation, Surgeon-General Donovan and his staff, who could not guarantee that all New Zealanders would be despatched after disembarkation to a New Zealand hospital. Again the fact that the New Zealand hospitals with the exception of No. 3 New Zealand General Hospital did not receive Imperial or any other troops but their own, and the fact that special types of cases always went to special hospitals, led to a waste of beds so that at times when the division was not fighting the hospital beds were not fully employed.

In July, 1916, the average wastage from the Division in France was about 9.6 per cent. per month. Of this 4.8 per cent. was reaching hospitals in the United Kingdom and the remainder either killed or in the L.O.C. Units in France. Sick and wounded then in hospitals in England numbered 90 officers, 2352 O.R., the average

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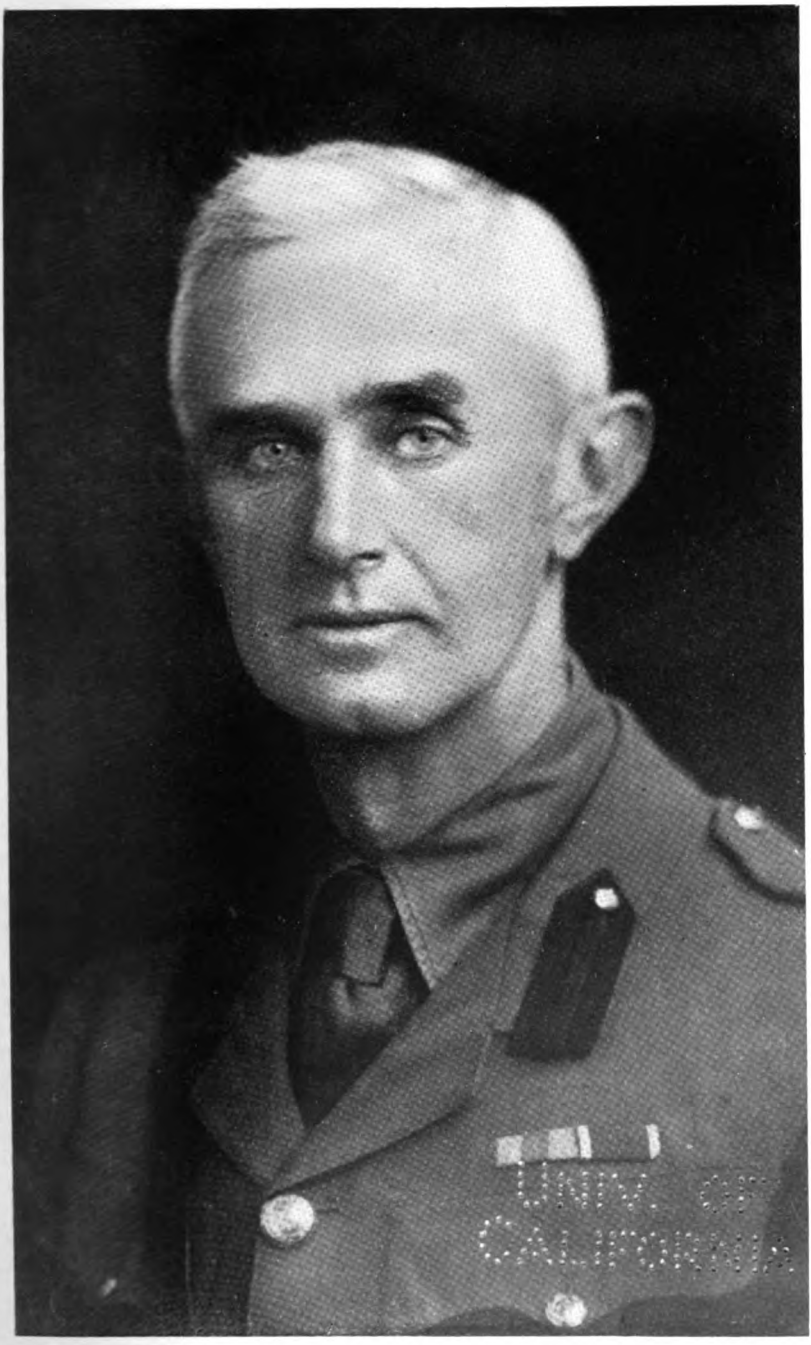
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COLONEL W. H. PARKES, C.M.G., C.B.E., D.M.S., N.Z.E.F.

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sick and wounded arriving in England was about 200 per week. Those arriving at Southampton went on to No. 1 New Zealand General Hospital at Brockenhurst; those disembarking at Dover, to No. 2 New Zealand General Hospital at Walton-on-Thames; all convalescents to Hornchurch—thence to Codford and so on to Sling. In all units a special system of rationing New Zealand troops had been devised; the ordinary army ration was drawn from the British A.S.C., the ration being supplemented by an extra meat allowance; 5½d. extra per diem being allowed by the N.Z.E.F., the total ration costing 1/9 per head per diem.

In October 1916, there were, as the result of the Somme fighting, 4740 sick and wounded in England. Of these the New Zealand H.S. *Maheno* took 370 patients back to New Zealand during the month. The wastage from the division was now at the rate of 300 per week. During the first six months in France the division had sustained approximately losses to the extent of 2,250 killed; 7,750 wounded; sick, evacuated to England, 1000. The per annum wastage was now estimated at 23,000, of which 2000 sick; 25 per cent. of all cases evacuated became "C" class; the total repatriations of unfit estimated at 4,375 per annum. At the end of the year the strength of the N.Z.E.F. in England was 12,124, of which the main groups were distributed as follows:—

New Zealand Hospitals, patients	1,764
New Zealand Convalescent Hospital	1,473
Command Depot	3,449
Sling Camp	3,229
Staffs and Hospital Staffs..	453

There were 4,636 reinforcements available, of which 1283 were at the Overseas Base at Etaples.

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CHAPTER XII.

Preparations for Messines.

By the 1st March, 1917, the whole of the New Zealand Division had cleared the Sailly sector and had taken over from the 25th Division a sector of defence in Belgium known as the Ploegsteert–Le Touquet sector. The right of the line extended as far south as the Lys, north of Armentières; the left touched St. Ives, the north-eastern corner of Ploegsteert Wood. The road running east from Ploegsteert to Warneton cut the position into two subsectors. In the right subsector the evacuation of wounded was superintended by the 1st Field Ambulance now in command of Lieut.-Col. M. Holmes* whose M.D.S. was at Pont de Nieppe in the Convent schools. There were two A.D.S.s: "Motor Car Corner," about half a mile north-east of Le Bizet, and the "Brewery Post" on the Armentières–Ploegsteert–Messines road about a mile due north of Le Bizet. Both A.D.S.'s were in Belgium, just across the frontier. At the Brewery there was fair protection, as much of the buildings remained, there were gas proof and shell-proof cellars and accommodation for one medical officer and 15 other ranks with one large ambulance car kept under cover of the stables. The wounded came down from the regimental aid post at Despierre Farm about a mile east by hand carriage, partly in the sap or by trench tramway when the weather gave concealment. A special truck marked with the red cross and capable of accommodating two stretcher cases was stationed near the R.A.P. at the bearer relay post. South of Despierre Farm in a dug-out magnificently named "Charing Cross Hospital" was the southern R.A.P. evacuating by the same means to Motor Car Corner about half a mile distant. At this last named post there was a gas-proof room in some ruined buildings and a protected shed for a small car; the staff consisted of one corporal and four privates N.Z.M.C. A good road from Le Bizet to Pont de Nieppe enabled both A.D.S.'s to be cleared by motor transport at any time by day or night. Continuing northwards along the road, past the Brewery, the village of Ploegsteert would have been reached and just north of it on the right hand side of the road on the western edge

*Replaced Lt.-Col. O'Neil, D.S.O., appointed to command the N.Z. Stationary Hospital.

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of the Ploegsteert Wood was the Charing Cross A.D.S. serving the left or northern subsector, manned by the 3rd Field Ambulance with a M.D.S. at Nieppe. Charing Cross A.D.S—whose name dated from 1914, given by London troops of the 11th, Hunter Weston's Brigade—was not far from "Hyde Park Corner," at the foot of Hill 63; it had three large concrete-protected gas-proofed Nissen bow huts; the personnel consisted of one medical officer, 15 O.R.. A large car was kept at this station. Our front line was on the eastern fringe of the Ploegsteert Wood and just behind in the support line within shelter of the wood were the two R.A.P.'s: the northern at "Dead Horse Corner"; the southern at "Rifle House." From both posts trench tramways were available for stretcher cases to a point not more than 200 yards from the A.D.S. at Charing Cross. A good road through Romarin permitted easy evacuation to Nieppe. Both M.D.S.'s were on the Armentières–Bailleul pavé, and were cleared daily by M.A.C. to the 2nd Australian C.C.S. at Trois Arbres. The Divisional Rest Station in charge of the 2nd New Zealand Field Ambulance was in substantial buildings at Steenwerck where the headquarters of the Division had their offices.

There was a certain liveliness in the St. Ives sector—raids, trench bombardments, and the like, which entailed a moderate number of casualties—but the evacuation of the wounded presented little difficulty, as the existing facilities were excellent. About the middle of March the Division readjusted its position, moving northwards beyond St. Ives. The 1st New Zealand Brigade was relieved in the Le Touquet sector by a brigade of the 3rd Australian Division holding Armentières, and our position was extended northward from St. Ives to the Wulverghem–Messines road across the valley of the Douve where we relieved the 36th, Ulster Division. Medical arrangements were handed over and fresh disposition of medical personnel became necessary. The new sector taken over was a prolongation northwards of our original line and extended from St. Ives, the southern limit, to the Wulverghem road where our left subsector ended. In front was Messines, only a little over half a mile distant, its battered church still a prominent mark on the opposing sky line. South to St. Ives our trenches ran across the forward slopes of Hill 63 which confronted Messine to the south-west and flanked the Ploegsteert Wood. The combination of high ground and a dense wood made the position a strong one; it had been saved from the wreckage of the first battle of Messines by Hunter Weston's Brigade, of the 6th Division, in October 1914, and presented

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a very solid obstacle to any further German advance in this area. In the depression between Messines and our hill and wood there ran the Douve stream, up the valley of which Wurtembergers had attempted to storm in 1914, and which subdivided our sector into two brigade fronts. Our line abutted on two roads leading into Messines: the southern from Armentières through Ploegsteert, the western, from Neuve Eglise through Wulverghem. At our back was Hill 63, and the wood to the south-east of it. On the rear slopes of 63 deep dug-outs had been prepared, approached by galleries driven into the hillside, and capable of housing a very large garrison.

The south side of the hill was well wooded; at the point where hill and wood adjoined was "Hyde Park Corner," a centre of considerable activity and evil fame as a shell trap for enemy artillery. The medical dispositions in this area were concentrated on the Charing Cross A.D.S., which we shared with the 3rd Australian Division; but in the northern sector an entirely different route of evacuation was established. The No. 1 New Zealand Field Ambulance moved to Ravelsberg just outside of Baillieul on the road that led through Neuve Eglise, via Wulverghem to Messines. The A.D.S. was at "Kandahar" Farm, on this road, about three to four miles east of Neuve Eglise, in farm buildings affording protection by splinter-proofs for about 100 lying cases. In front were two R.A.P.'s one at St. Quentin Cabaret, just a mile further east along the road, the other at a farm called La Plou Douve in the Douve Valley, both very much exposed to observation from Messines ridge which dominated the valley as far as the high ground about Neuve Eglise. Kandahar Farm was in telephonic communication with the M.D.S. at Ravelsberg, and was in touch with trench tramlines leading into the forward positions. It was distant from our front line about a mile and a half, at the nearest point, where the trenches crossed the Wulverghem–Messines road. Two large ambulance cars were kept at the A.D.S., and evacuation to Ravelsberg via Neuve Eglise, a distance of about 3½ miles, could be safely accomplished with motor transport, even by daylight.

Precautions against gas were at this time subject to very careful consideration. The Russian General Staff had reported an increased use of gas shells on their front; and prisoners we had taken had heard that a new form of lethal gas was to be used shortly. For these reasons a very thorough revision of gas defensive measures was initiated: the Divisional Gas Officer, Capt. G. Borrie, N.Z.M.C., was at special pains to revise the gas appliances of the Field Ambulances. Special drills and a very

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stringent inspection of box respirators was ordered by the Division, and gas standing orders were promulgated, which were of a very complicated and comprehensive nature. The gas N.C.O.'s were supplied with special vacuum flasks for the purpose of obtaining specimens of any gasses that might be liberated.

Early in March, the D.D.M.S., Col. Begg, C.M.G., visited the D.M.S. Second Army, for the purpose of discussing the scheme for evacuation of wounded during the forthcoming operations. The military plans for the capture of Messines were now well in hand, and the troops destined to carry out the operation, the 25th, 3rd Australian, and the New Zealand Divisions, in the IInd Anzac Corps area, were already concentrated in their positions of assault. Ultimately, as the result of personal inspection, Colonel Begg selected two sites for the C.M.D.S.'s; the first draft of the plans allowed for the accommodation of 1,300 patients, in hospital Nissen huts and marquees at both stations.* Westhoff Farm on the Baillieul–Neuve Eglise road, about a mile ahead of the Ravelsberg M.D.S. of the No. 1 New Zealand Field Ambulance was the site chosen for the left sector C.M.D.S. and Pont D'Achelles, at a point on the Baillieul–Armentières pavé where the road from Ploegsteert via Romarin joined it, about four miles from Baillieul, was selected to serve the southern, St. Ives sector. The plans for these stations were drafted by the Corps Engineers in collaboration with Colonel Begg, and made provision for 6 large and 22 small Nissen bow huts, together with the necessary kitchens, ablution places, latrines, incinerators, horse lines and roadways for each station. In addition to the erection of the buildings it was proposed to utilise 25 marquees at each station, and it was anticipated that both establishments would be completed by the middle of April. The work was put in hand forthwith, working parties being provided by the Ambulances. At Westhoff Farm a N.Z.M.C. officer and party took up permanent quarters; the Pont D'Achelles Station was erected by A.M.C. details from the 3rd Australian Division. Large quantities of roadmaking materials, broken bricks and other debris, were brought up at night by ambulance transport from the ruins of Armentières. By the end of March the completed medical arrangements made by Colonel Begg for the Corps front were drafted and circulated to the various divisions, but, as these plans were somewhat modified, by the postponement of the operations, we will consider them more in detail presently. The chief concern of the A.D.M.S. of the New Zealand Division,

*Hospital Nissen Bow Hut: Bow shaped; constructed of corrugated iron; lined with match boarding. Dimensions, 60 x 42 x 19ft. 10ins.

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Colonel McGavin, at this time was the supervision of these important medical arrangements for offensive operations.

Early in April the New Zealand troops, a brigade at a time, were relieved from duty in the trenches and sent out into the back areas where they underwent a period of intensive training on ground similar to that over which they were to attack. They had demonstrations on the subject with the aid of very large sized models of the terrain, in which every trench, sap, and strong point in the Messines position was reproduced.

An extraordinary amount of care was devoted to this special training and to the work of the Divisional Trench Warfare School near Ravelsberg, as it was realised by the Higher Command during the Somme operations that lack of skill in the intricacies of modern warfare and in the apt use of the newer weapons had resulted in casualties to British troops which could have been avoided by greater individual skill-at-arms. A certain detail of medical personnel accompanied each brigade during its period of training in the back areas.

Several important administrative adjustments in the N.Z.E.F. were made during this period, the chief of these, the formation of the 4th Brigade Group. In April, 1917, the strength of the N.Z.E.F. in England was over 15,000; it had grown in consequence of the lowered rate of wastage from the Division during the winter months; there were now some 10,000 "A" Class men available as reinforcements and the Division in France was over strength. It was hoped, at the time, that a new Anzac Division might be formed by two brigades of Australians in England, with the addition of the 4th New Zealand Brigade. The supply of the necessary reinforcements from Australia and New Zealand, however, presented insuperable difficulties to the fruition of the proposal, well favoured both by the War Office and the Anzac Commanders in France. New Zealand certainly disapproved of the continued existence of a 4th Brigade Group, but acquiesced in its temporary constitution and employment, with the proviso that it should not be reinforced and that it should ultimately be broken up to supply reinforcements for the Division. Early in April a special cadre of seasoned officers and N.C.O.'s was sent to England to join and train the new units required, and to organise the group, which was to be commanded by Brigadier-General Hart, D.S.O. At the end of April two N.Z.M.C. officers with picked N.C.O.'s were ordered to England to mobilise No. 4 New Zealand Field Ambulance, which one of these officers, Lieut.-Col. McLean, N.Z.M.C. was to command.

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The unexpected demand for officers and men to complete the new medical unit put a severe strain on the resources of the N.Z.M.C. personnel in the United Kingdom. The number of officers N.Z.M.C. with the N.Z.E.F. in England and France, at this time, totalled over 150. The services of the Anzac Corps, the Division, the Stationary Hospital, the Overseas Base in France including reinforcements, required 74 officers; and the front line units had a first call on reinforcements. The base units in England were below minimal establishments. and were working at a disadvantage owing to lack of sufficient staff. Some small accession of strength came from the enrolment of New Zealanders who joined the N.Z.M.C. on completion of their engagements with the British Forces; but the prevision made in 1916, of a shortage of medical officers for the N.Z.E.F. was now fully vindicated. To some it appeared that the resources of New Zealand in medical man-power hardly justified the maintenance in England of three general hospitals which, had they been fully staffed, would have absorbed as many officers as were required for the N.Z.E.F. in France. The policy of segregating New Zealand sick and wounded in our own hospitals had met with adverse criticism certainly, but it had the approval of the D.G.M.S., Sir Alfred Keogh, who agreed with the contention that under our own medical supervision, men of the N.Z.E.F. were returned to duty in a shorter time than when distributed in British Hospitals throughout the United Kingdom.

In order to provide the necessary O.R., N.Z.M.C., each Base Hospital was called upon to contribute its quota of men. The draft from No. 1 N.Z.G.H. was relatively the largest: 6 N.C.O.'s and 55 privates; but the other general hospitals each supplied a quota of trained N.C.O.'s and orderlies whose place was taken by V.A.D.'s and "C" class men. Increased reinforcements, both of N.Z.M.C. officers and men were demanded from New Zealand, more especially as the sinking of Hospital Ships during the unrestricted submarine offensive compelled the replacing of N.Z.A.N.S. by N.Z.M.C. details in the two New Zealand Hospital Ships. No. 4 New Zealand Field Ambulance was mobilised at Sling Camp on the 28th of April. The personnel consisted of a draft from the New Zealand General Hospitals of 145 N.Z.M.C. N.C.O.'s and privates made up to strength from the 22nd Medical Reinforcements and by the necessary A.S.C. and M.T.A.S.C. details. The first step taken in the training of the unit was to send all the N.C.O.'s and junior officers to a special "bull ring" class organised by the infantry instructors. A short, brisk course

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of physical training, squad drill, platoon and company drill was completed, which was of the greatest possible advantage, more especially to the N.C.O.'s. It was unfortunate that the full course of infantry training of the unit could not be carried out at Sling Camp, where the character of the work, the discipline, and morale were of the best; but for some reason it was found necessary to move the unit to the R.A.M.C. Depot at Blackpool. The training at Blackpool was a disappointment. A field ambulance as a complete unit had not previously been mobilised there. The staff of the Depot were most anxious to help in every way, but there was a shortage both of instructors and equipment. Later it was found that equipment could be drawn in the Southern Command, so that our ambulance was obliged to move to Codford for final equipment. So many days were wasted by these moves that there was not sufficient time in which to instruct the men in the use of the field equipment. In spite of these disadvantages and thanks, mainly, to the hard work of the N.C.O.'s brought from France, whose experience in field work had been gained in Gallipoli, Egypt, and on the Western Front the ambulance was ready to take the field after less than three weeks training. The formation of the new ambulance demonstrated the importance of infantry training as a basis for field medical work and the necessity of obtaining men of good physique and high endurance, at least for the bearer personnel. Full and meticulous training in gas defensive measures was deemed to be equally important as all other considerations, as our bearers were at times obliged to work for long periods in gas laden zones, and were liable to serious casualties thereby.

The reorganisation of Sanitary Sections had been made the subject of a special meeting of the Second Army Medical Society held during the month of April, 1917. The questions at issue were thoroughly discussed by officers interested, D.A.D.M.S.'s, Sanitary Section commanders, and officers in charge of Mobile Laboratories. The concensus of opinion expressed was: that all Sanitary Sections should be guided by a central policy dictated by approved scientific thought and that uniformity of detail in execution was most essential; and further, that in order to attain continuity of local effort, Sanitary Sections should remain in allotted areas and should not move with divisions. The outcome was a new organisation and distribution of Sanitary Sections which became Army units, detached from their respective divisions. So, the New Zealand Sanitary Section in command of Captain Sinclair, N.Z.M.C., D.P.H., passed under Army control on the 15th

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of April, 1917, and was allotted an area which coincided with the existing distribution of the New Zealand Division.

Another important medical unit, the New Zealand Stationary Hospital at Amiens, was about to move up into the Second Army area. During the six months, July to December, 1916, some 11,870 British troops had passed through the unit, of which 10,865 sick and 1005 wounded during the active operations at the Somme. The mortality amongst the wounded was about 10 per cent. and of the sick about ·28 per cent. In October, 1916, Majors Acland and T. D. M. Stout, N.Z.M.C., were detached for surgical duties to the 2/2 London and the 36th C.C.S. respectively, and with them went six ladies of the N.Z.A.N.S. for similar duties in the Casualty Clearing Stations. The commanding officer, Lieut.-Col. McGavin, on promotion to the appointment of A.D.M.S. to the New Zealand Division, was temporarily relieved by Major Acland until Lieut.-Col. O'Neil, D.S.O., late commanding the No. 1 New Zealand Field Ambulance took command of the hospital in November. At the end of October, Major Acland was appointed Consulting Surgeon to the N.Z.E.F. and was posted to No. 1 N.Z.G.H. with the rank of Lieut.-Col.; relieving Lieut.-Col. Barnett, N.Z.M.C., as consulting surgeon and head of the surgical division at Brockenhurst. Early in the spring of 1917, the stationary hospital, which had an average bed state of about 350, increased the accommodation to over 400 by opening an annexe as an officers' auxilliary and sick sisters' hospital. This necessitated some increase in personnel which was met from N.Z.M.C. reinforcements and a few P.B. men. The establishment of the unit was at this time defined in N.Z.E.F. Orders as:—17 officers, 34 sisters N.Z.A.N.S., and 141 O.R.—total 192. In March, 1917, the actual strength was 18 officers; 161 O.R., and 35 Sisters. In this month as the result of the forward move of the Fourth Army, who were now keeping step with the German strategic retirement to the Hindenberg line, there was a considerable falling off in the local admissions; and in April, Amiens came under the L.O.C. control when the Stationary Hospital ceased to act as a C.C.S. and passed to the command of the D.M.S. L.O.C. This, of course, is the normal disposition of a stationary hospital, but the New Zealand unit had always desired a more forward position, in fact, wanted to be a C.C.S.; it was the first expressed wish of the commanding officer on disembarkation in Egypt, in 1915. Circumstances, not as yet clearly defined, prevented a very desirable change of designation and organisation, and although it was the wish of the N.Z.E.F. that the New Zealand Stationary Hospital should be brought up

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into the vicinity of the Division, no steps were taken to convert it to a C.C.S. In May, welcome orders came from the Q.M.G. to hand over to the 59th General Hospital at Amiens and to report to the Second Army. On arrival, at Hazebrouck Lieut.-Col. O'Neil relieved the 12th C.C.S., taking over 118 patients and exchanging certain portions of the equipment. The buildings handed over formed part of the College St. François—a girls' boarding school —and were three storied. On the ground floor there was a large ward of 50 beds with an operating room for two tables. On the first floor were two wards for 40 and 80 beds, respectively; and on the second floor a ward for 88 beds, with a recreation room and dining room. The capacity of the building, after certain modifications had been made, was 304 beds, and 50 extra stretchers if required.

The early months of 1917, in Flanders, were bitterly cold and spring was late in coming; frosts and occasional snow with intervals of wet weather continued throughout April, but by the middle of May, fine, warm weather and, at times, a somewhat oppressive heat finally banished the winter. The New Zealand Division with an average strength of 20,250, had reached a very considerable degree of general fitness. During the month of May, the sickness wastage rate had fallen as low as 3.9 per 1000; the lowest rate for any month the division had spent in France. During April and early May the infantry brigades had, each in turn, enjoyed a spell of hard training away from the trenches which improved their health considerably. Yet the Division was in the throes of a mumps epidemic which had reached its acme at the end of March, and was still lingering on. The epidemic began in December, 1916, and was assumed to have spread to us from the 3rd Australian Division, then on our left, and in which the disease had become epidemic since its arrival in France. Measles and mumps were both responsible for a very considerable temporary wastage in the British Armies in France: in the year 1916, no less than 4,333 cases were reported, and of these, 3,629 were Australians. The incidence was chiefly in men who came from sparsely inhabited countries—the Highlands, the Scottish Islands, Australia, New Zealand and the frontiers of India—whose levies had not as yet acquired the immunities normally present in other British troops recruited from more densely populated countries. In spite of early precautions, such as segregation of contacts and disinfection, the disorder spread rapidly and simultaneously through all units, so that isolation of contacts became impossible without dislocating the work of the

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division. The maximum incidence was reached on March the 24th, when 142 cases were evacuated during the week; a total of 769 cases was recorded up to the end of April. There was a simultaneous outbreak of measles, though not on a large scale: 128 cases in all. While the 3rd Australian and New Zealand Divisions suffered heavily the 57th and the 34th, who at the time formed part of the IInd Anzac Corps, were not affected. Apart from metastatic orchitis—which was frequently observed—the long period of incubation and the quarantine of 24 days caused serious wastage and made the disease somewhat formidable in susceptible troops. In April Col. Begg decided to mass all the mumps cases in the Corps in No. 1 New Zealand Field Ambulance who opened a mumps hospital for the purpose. The percentage of testicular metastasis was high in the Dominion troops, and in some instances the orchitis appeared to be the only symptom complained of, the swelling in the paratoid gland being very slight or inconspicuous. In the month of May, 144 cases were admitted to No. 1 Field Ambulance, when complication by orchitis was still more frequently observed: of 404 cases admitted 131 had metastatic orchitis, a percentage of 32. Lieut.-Col. Holmes, N.Z.M.C., made an interesting observation that in cases of double orchitis much relief was afforded by a free incision of the tunica vaginalis with improved prospects of continued function. With the warm weather in May, there was a marked falling off in the numbers admitted and had it not been for this epidemic, the general health of the division would have been excellent.

The curious immunity to trench nephritis in New Zealanders and Australians was commented on by Colonel Soltau, consulting physician to the Second Army, at a meeting of the Medical Society, held at the 2nd Canadian C.C.S., at Remy Siding, on the 11th of May. Colonel Soltau said that there had been 718 cases observed in the Second Army during the past three months, of which the New Zealand Division had 10 cases only, and the 3rd Australian, 6; both of these Divisions of the IInd Anzac Corps, had much the lowest incidence in the Second Army; the 25th Division was evacuating 20 cases per month.

Owing to the increase in enemy submarine activity, a rigorous policy of economy in food stuffs was now being enforced in the B.E.F. The New Zealand Division, apparently without any difficulty, excelled in securing economy—more especially in fats—the average quantity of first class dripping saved by the New Zealand Division was over twice as many pounds as any other

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division in the corps, and probably the Army. The total amount of fat forwarded by our Division to the base since the inception of the scheme was 43,302 lbs., averaging 6000 lbs. per week, of which two-thirds at least, first class dripping. The cheese ration, a more palatable form of fat ration, was underdrawn by 10 per cent. and preserved meat to a lesser extent. Whatever the reasons adduced for this economy, it is clear that dripping and cheese were not popular foods with the New Zealanders. Even in New Zealand the peace training ration of 1912, which provided 133 grammes of fat, part of it in good butter, resulted in a waste of fats. It was not likely then that our troops could utilise the full fat content of the standard war ration namely, 150 grammes per diem, at least in the forms provided by the ration. It would perhaps be rash to attribute high sickness wastage to low fat consumption, but it does appear that there was a measure of association between the sickness wastage rate of units and their fat consumption as estimated by their dripping returns. Such a calculation has been made for 12 New Zealand Battalions for a period covering 40 weeks in 1917, and it emerges that the battalions which used least fat had the highest sickness wastage, the degree of association being .643, which amounts to very good grounds for belief. Our men, at this time were unquestionably fit, but as compared with British troops, they appeared to be lean and a trifle too "fine" in condition. There was plenty of hard work doing at the time in preparation for the coming onslaught.

Active operations on a large scale on the Somme front had ceased by the end of November, 1916, owing to unfavourable weather conditions, but to the north of the Ancre some heavy fighting continued, during which Thiepval and Beaumont Hamel were taken. The plan of campaign for 1917, as projected by Joffre and Haig, contemplated a joint offensive on the Somme front in February or April. But a change in national and political views abhorring the war of attrition, the "blood bath" of the Somme, led in France to the demission of Joffre and Foch; and a new plan of operation, by whirlwind battles on the Aisne heights, devised by Nivelle was universally hailed by England and France as the new short cut to victory. At a conference of Premiers at Calais in February, Sir Douglas Haig was subordinated to the French Generalissimo, and was instructed to support the Aisne campaign to the fullest extent. Part of the Joffre–Haig scheme included an attack on the northern hinge of the Siegfried line in front of Arras; it was agreed that this

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stroke should precede the larger French operations; meanwhile the Germans retired slowly to their Hindenberg fortresses, and the Russian Revolution temporarily paralysed the Eastern Front.

The British "push" at Arras early in April, although limited in extent, was extraordinarily successful. Vimy Ridge and Bullecourt were taken with about six miles of the Siegfried line, and as compared with the Somme offensive of 1916, our gains were greater and our losses much less. Nivelle's armies attacked in great force in the Champagne, but were brought to a stand some seven miles short of their objective, the Laon Plain; a local tactical success, but of no strategic importance, bringing no compensations for the heavy casualties, disappointment, and loss of morale which the failure of the ambitious scheme carried in its train. The fighting about Arras had to be maintained for a much longer period than was anticipated—so postponing the Flanders Campaign—in order to give support to the long drawn out French operations. The schemes of the Allies had failed, at least in bringing an end to the war, a consummation seriously envisaged by the more sanguine: Nivelle was replaced by Pétain, who was to nurse the French Armies back to a more optimistic mood, and Sir Douglas Haig was left free to prosecute his Flanders Campaign, also a part of the old Joffre-Haig plans for 1917. To this course the British Cabinet was agreed in May.

Early in the war Sir John French had foreseen that the continued occupation of the Belgian ports by Germany would prove a very real danger to England. The unrestricted submarine campaign, which, according to Von Tirpitz was to strangle England in a few months, and the frequent bombing raids on London, had their respective bases of operations in the neighbourhood of Ostende and Zeebrugge. An advance to Bruges through the Ypres salient would cut off these bases, but, before troops could debouche from the Ypres salient or concentrate within it, it must be enlarged by capturing all the high ground which superior forces of men and guns had enabled the Germans to seize in 1914. The first step was to make good the heights about Messines and Wytschœte, so gaining observation and providing a pivot for further manoeuvre. For the reasons explained, the Messines attack was delayed by six weeks, the first plans were completed by April the 15th, the original anticipated date for the opening of the Flanders Campaign; the delay was to have serious consequences. The British Army was now to assault the enemy alone, the French Armies for the time remaining inactive Something was still hoped for from the Russians, but better

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still the United States had now definitely joined the Allies and by May some assistance in medical troops was coming from across the Atlantic.

The second battle of the Messines–Wystchœte Ridge may be taken as the perfected type of the battle of limited objectives. Preparations had been under weigh ever since the late autumn of 1916, which included the laying down of broad gauge and narrow gauge railways leading right into the heart of our positions, the formation of many new roads, mining operations of an unheard of magnitude, and at an unusual depth, and the accumulation of vast stores of ammunition and engineering material. Not the least important of the preparations was the training of the troops. Each division destined to assault the position knew its sector as it had trained in the back areas, over exact models of the positions to be taken. The topography of the trenched country had been studied in all its intricacies by aerial photographs, and the front line had been systematically explored by reconnaisance patrols. "The final preparations were carried out," says Sir Douglas Haig, "with a thoroughness of organisation and an attention to detail which are beyond all praise."

The medical arrangements made by the Second Army, the Corps and the New Zealand Division were no less thorough. Early in March Surgeon General Porter had summoned the D.D.M.S.'s of the various corps to discuss the medical plans. The allocation of duties to the various commands were clearly outlined. The A.D.'sM.S. of divisions were to be responsible for evacuation of the wounded from the fighting line to the Corps Main Dressing Stations. The D.D.'s M.S. of corps would supervise the evacuation from the corps dressing stations, and the transport of both lying and walking wounded to the Casualty Clearing Stations to which end a Motor Ambulance Convey was placed at the disposal of each D.D.M.S. Three Corps were to be engaged at the assault on the Messines–Wytschœte Ridge; from north to south: the Xth and the IXth and the IInd Anzac, each Corps having four divisions. The medical arrangements made by each Corps were somewhat similar to those adopted by Colonel Begg for the Anzac Corps, and which we propose to consider more in detail. The Army arrangements included the allotment of the C.C.S.'s of which, No. 53 British, in the Asylum Buildings at Baillieul, and the 2nd Australian C.C.S. at Trois Arbres, not very far from Pont d'Achelles Corps Main Dressing Station, were the chief. Special C.C.S.'s were detailed for particular

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classes of casualties: No. 11, at Baillieul East was to be used for lightly wounded from our Corps; one C.C.S. was reserved for officers, sick and wounded. All gun-shot injuries of the head, fit to travel the distance prior to operation, were to go to the New Zealand Stationary Hospital at Hazebrouck, about eight miles by road from Baillieul. The New Zealand Hospital was also to take the overflow from C.C.S.'s and to hold cases for a longer period than the more forward units. The nearest C.C.S. to the firing line was No. 2 Australian, at a distance of about 5½ miles, in a direct line from Messines Village, and within the zone of long range enemy artillery fire. At Baillieul the C.C.S.'s were, say, eight miles from the front, but still subject to very long range artillery fire; even Hazebrouck, at a later period, came under fire from naval guns at extreme ranges of from 20 to 21 miles. Considerable use was to be made of the network of railways both broad and narrow gauge, to clear lightly wounded to the Army units, and for bringing up the Ambulance Trains to the sidings near the Casualty Clearing Stations. In order to avoid overcrowding at the C.C.S.'s, each corps was to set apart at least one Divisional Rest Station, to which men, not seriously ill, could be sent pending final disposal; as few as possible were to be evacuated during active operations. The C.C.S.'s were so staffed as to be able to deal with 150 lying cases in one batch; three surgical teams* and three extra medical officers with six sisters were detailed to each, and a certain number of extra stretcher bearers drawn from category men. At the New Zealand Stationary Hospital, an adjustment of accommodation and an increase of beds was made necessary by the special duties imposed. An additional operating theatre was fitted up with the X-ray room adjoining; a small plant used for lighting the college supplied the necessary power for the X-ray apparatus. Certain extra buildings were taken over from the 50th C.C.S. and the "Sous Prefecture" and the "Clinique," municipal buildings, were also requisitioned; at the "Clinique" there was an operating theatre. Already by the 24th of May head injuries were coming into the New Zealand Stationary Hospital and were subjected to operation under favourable conditions.

Very explicit instructions as to the surgical treatment of the wounded were issued by the Second Army, the more important being these:—Eusol was recommended as the standard lotion; picric acid 2 per cent. solution was to be used for skin sterilization in place of iodine; operations forward of the C.C.S. were to be restricted to the arrest of haemorrhage and the removal of

* A.C.C.S. surgical team consisted of: 1 surgeon, an anasthetist, a sister, and an orderly.

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hopelessly shattered limbs; morphia was to be used sparingly. In all cases of fracture of the femur or wounds of the knee joint, the Thomas splint was to be applied; wounds of the thorax were to be made air tight by immediate suture. Wounded in a condition of shock were to be retained for rescuscitation at the dressing stations, and were to receive hypertonic saline infusions* with the administration of camphor in olive oil; morphia was to be withheld or at least given in very small doses. The use of morphia and anaesthetics generally, in the forward dressing stations had been found to increase post operative mortality in the C.C.S. Unquestionably the dosage of morphia in the early years of the war had been excessive: some of the wounded dosed themselves from private stores, and half a grain by the mouth was not infrequently given at the R.A.P.; if hypodermic injection of a further dose was administered at the A.D.S. or M.D.S. the patient was dangerously drugged by the time of his arrival at C.C.S. In all cases the time of administration and the dose of morphia given was to be noted on the tally or field medical card. In the early treatment of gassed cases, bleeding and emetics were recommended, with continuous administration of oxygen, to which purpose the Corps Main Dressing Stations were equipped with oxygen inhalation sets. All these recommendations—Army Orders we may say—were to a great extent devised by the consulting surgeons and physicians of whom Sir Anthony Bowlby, Consulting Surgeon in Chief, was foremost. Colonel Gordon Watson and Colonel Soltau were the Second Army Consultants.

The IInd Anzac Corps objectives were limited to the southern portion of the battle field, including Messines village; four divisions were to be employed on a front of about 6,000 yards. A rough estimate of the casualties to be anticipated would be 15,000, allowing for 25 per cent total casualties, of which 1 in 4, killed, leaving about 11,000 wounded; of these over 5000 would be lying cases. Owing to the presence of Hill 63 in the centre of the corps front, and in order to conform to the elaborate traffic control arrangements, Colonel Begg found it necessary to establish the two corps M.D.S.'s already referred to: one for the northern routes at Westhoff Farm; one for the southern routes at Pont D'Achelles. His line of evacuation in the northern sector was to the C.C.S.'s at Baillieul, in the southern to the 2nd Australian C.C.S. at Trois Arbres. No less than four Casualty Clearing Stations were available for his purposes: the 11th at the railway siding at Baillieul was to take the overflow from the

* Sodium Chloride, 180 grs.; Potassiam Chloride, 4.5 grs.: Calcium Chloride, 4.5 grs.; Boiled water, 1 pint.

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2nd Australian at Trois Arbres, which could accommodate 1000 cases. The medical personnel at his disposal consisted of 13 field ambulances including the 4th New Zealand Field Ambulance which arrived at Baillieul on June 1st, and a proportion of category men placed at his disposal. The services of each of the two C.M.D.S.'s required six complete tent subdivisions provided by the divisional ambulances which also furnished the necessary staff for a corps walking wounded collecting post, and for three corps rest stations situated at L'Estrade, Steenwerck and Ravelsberg to be used for the reception of slightly wounded and less seriously sick. At Ravelsberg all cases of functional disorder, shell shock and the like were to be temporarily housed and treated. The transport available was: 1 M.A.C. for lying wounded; the various train services for lightly wounded; and a special service of motor omnibuses. Two circuits for the buses with a five minutes service and regular stopping places were arranged: in the northern sector, from Baillieul to Westhoff, on a circular route with stopping places at the C.M.D.S., Ravelsberg, and certain C.C.S.'s in Baillieul; in the southern sector the buses ran as far as the Corps Rest Station at L'Estrade and Steenwerck with a stopping place at Trois Arbres for the Australian C.C.S. Each bus held from 20 to 25 sitters and had instructions to unload only at a given point, so as not to interrupt the timing of the circuit. Each bus load, therefore, had to be made up of patients bound for a common destination. The Corps arrangements included the due recording of all casualties; the rendering of the necessary casualty reports; and the administration of antitetanic serum. Colonel Begg's original arrangements were completed in April, but in consequence of the postponement of the operations, were somewhat elaborated during the interval. The 3rd Australian Division was instructed to take over the D.R.S. at Steenwerck and Lieut.-Col. Holmes had orders to clear his mumps hospital at Ravelsberg and to increase his tentage, so as to receive slightly wounded and "nervous" cases. The 25th Division and the 3rd Australian were to take 600 cases each in the corps rest stations and were to clear all their present patients by the 30th of May.

The divisional medical arrangements, which concern us most may now be examined. The front held by the New Zealand Division and from which we were to assault, lay between the Wulverghem and Ploegsteert roads as they converged from west and south to enter Messines about a mile away along these roads from either flank. The centre of our front line was just half a mile from Messines Church, and touched the Steenbeck,

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a muddy creek at the foot of the hill. A formidable position lay in front: there were no less than three organised lines west of the village, and others behind it, partly on the reverse slopes of the hill; there was a "switch" running east to a very strong 4th line traced from north to south, the chord of the salient about three-quarters of a mile to a mile in rear of the village. Severe fighting was to be anticipated as the enemy were prepared and in strength both of guns and men. From these considerations it was prudent for the A.D.M.S., Colonel McGavin, to anticipate many casualties in the Division. The medical arrangements for the evacuation of wounded in the divisional area centred about the advanced dressing stations: in the northern sector, Kandahar Farm; in the southern, Underhill Farm. In rear of the front line, three quasi-permanent regimental aid posts had been specially constructed and protected. From north to south they were:—Boyle's Farm, dug-outs in a communication trench about 200 yards from the front line, and close to the Wulverghem-Messines road, affording accommodation for one R.M.O. on the left of the divisional front; Fort Osborne, R.A.P., 600 yards south of Boyle's Farm accommodated two regimental medical officers and eight bearers N.Z.M.C.; and, furthest south, Spring Street R.A.P. with a similar capacity. Each of these stations had been enlarged and specially protected and made splinter-proof by the N.Z.E. The sites had been selected by the A.D.M.S. in consultation with the General Staff of the Division. The routes of evacuation from each varied: from Boyle's Farm the route lay through a C.T. known as Boyle's Cut, and an avenue "Medicine Hat Trail," to the Wulverghem road. In the vicinity of Boyle's Farm, as it lay on a forward slope towards Messines, the road was inoperable but 1000 yards further back it fell again into dead ground near St. Quentin Cabaret, where the sap opened out on the road. From Fort Osborne wounded could come down by King Edward's trench to Medicine Hat Trail, so joining the road, or by night—when not observed—by trench tramline above ground. From Spring Street the southernmost R.A.P. by Currie Avenue or by trench tramway. Special trucks to take four lying cases were available on the trench tramways but their use was limited by enemy observation, conditions of barrage and so forth. Two bearer relay posts were provided for the service of the R.A.P.'s. One known as "McBrides' Mansions" was three-quarters of a mile from Boyle's Farm and situated near St. Quentin Cabaret, where the saps opened out on the road. The other at Ration Farm about half a mile west of Spring Street R.A.P. Both bearer

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relay posts were in sandbagged dug-outs and held some reserves of medical equipment; their function was to take over the wounded from the bearer parties coming down from the R.A.P.'s. All stretcher cases were carried to the A.D.S. at Kandahar Farm from the northern sector. The farm had previously been used as an A.D.S. by other divisions, the chief advantage of the site lay in the fact that it was in dead ground. The distance from Kandahar to Boyle's Farm by road was about a mile and a half and somewhat more to Spring Street across country.

During the month of May, a great deal of protective work was made at the farm by working parties from No. 1 New Zealand Field Ambulance. The outer walls of the barn were reinforced by a sand-bag breast work 9 feet high and 10 feet wide at the bottom. The ceiling of the ground floor was timbered with six inch props.; above the ceiling which was of brickwork, an "air space" of three feet was made by means of sand-bag buttresses supporting iron rails which were crowned by concrete "bursters." Some parts of the A.D.S. were further protected by curved iron dug-outs constructed inside the buildings. Two large cylindrical water tanks were embedded in the sand-bag walls on the western side away from the enemy fire. A sandbagged shelter in the lea of the farm buildings provided a garage for two motor ambulance cars always stationed at the A.D.S. A good road constructed from the pavé into the yard gave access to the many doorways of the fortified barn and returned in a broad sweep to the road by a separate exit. The material for the roadways was collected by night from ruined brick buildings in the neighbourhood and was carted by the ambulance transport. No casualties luckily resulted in men or horses engaged in this work, but part of the buildings was destroyed by shell fire on the 29th of May, the thatched roof of the farmhouse was set alight and considerable damage resulted; one medical officer, Captain Kidd, N.Z.M.C. was severely wounded. The elephant dug-outs inside the farmhouse remained intact; the barn was not damaged. It was a large building and provided four chambers, of which two measured 24 feet by 20 feet. One used as a dressing station could accommodate four operating tables and had a gas proof exit on to the car roadway; the other a large receiving chamber of the same size as the dressing room, provided shelter for stretcher cases, 28 of which could be accommodated in two tiers on wall racks leaving ample room for bearers. The large receiving room had also a gas-proof doorway for admitting stretcher cases. One smaller room 20 feet by 13 feet gave off

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the receiving room and supplied racks for eight stretcher cases in pairs disposed around the walls. A small central receiving room 20 feet by 11 feet with gas-proof doorway opened on to the dressing room on the left, and the receiving room on the right. Two smaller dressing stations also protected and provided with elephant dugouts could take 40 loaded stretchers so that in all there was ample room for over 70 lying cases. The wounded on stretchers coming down from the bearer relay posts, either by hand or by trucks on the trench tramway which ran into the farmyard, were taken through the sandbagged doorway into the small receiving room from there passing either to the dressing room on the left, or the receiving room on the right, and could be evacuated to the cars on the roadway by three doors at once if necessary. Evacuations from the A.D.S. were by motor ambulance or horse transport to Neuve Eglise, thence to the corps M.D.S. at Westhoff, a journey of about two and a half miles.

The personnel to be provided for the A.D.S. was:—2 tent subdivisions and 1 bearer subdivision. The equipment included: 600 blankets; 100 stretchers; 5,000 shell dressings; 20 trestles for stretchers; 4 medical comfort panniers; 400 assorted splints; 100 pyjama suits; 2 F.M. panniers; 2 field surgical panniers; 30 hot water bottles; 2 field fracture boxes; 4 Sawyer stoves; 6 primus stoves; 25 camp kettles; 50 petrol tins containing water; 100 gas helmets and 6 acetylene lamps.

The divisional collecting station for walking wounded was at Leeuwerck Farm, situated on a road which ran east and west through the sector, and had access to the Neuve Eglise–Wulverghem road. The route from the trenches was flagged and marked by white-washed posts to maintain direction at night, so that walking wounded could find their way easily. A dressing station had been built at the farm, but owing to heavy shelling it had to be abandoned at the end of May. Another collecting station was prepared close at hand, but at the end of the month, Leeuwerck Farm was repaired; it was supplied with dressings and comforts and a coffee stall for refreshments. A car post for a Ford car was close at hand and could be used in emergency for the evacuation of a lying down case from any of the battery positions in the vicinity. In the northern sector, then, there were three R.A.P.'s from which evacuation of stretcher cases could be effectuated either by communication trenches, by trench tramways or by hand across country to the bearer relay posts, which were adjacent to roads where wheeled stretchers could be used as far as the A.D.S., whence by motor ambulance to the

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C.M.D.S. at Westhoff. Walking wounded were to be directed by orderlies stationed at critical points along flagged and well marked tracks to the divisional collecting point at Leeuwerck Farm, and thence after refreshment and dressing, if required, to broad gauge railway entraining points, or by car to A.D.S., or on foot to the corps M.D.S.; returning lorries would be utilised as far as possible to take down walking wounded.

In the southern sector, south of Hill 63, somewhat similar conditions were provided. An A.D.S. at Underhill Farm, near Red Lodge had been prepared by the N.Z.E. assisted by the 3rd Field Ambulance. It lay close in under Hill 63, thus obtaining protection from observation, but as very many gun and howitzer positions required the same advantages the area was subject to very heavy bombardment at times, for which reason the structures required to be heavily protected by sand bags and overhead cover. Some of the wounded from the extreme right of our line would, it was anticipated, find their way across the western slopes of the hill to Underhill Farm, but as it was to the south of our line of assault it was not considered to be so important as the northern A.D.S. A very detailed plan of this elaborately fortified A.D.S. is to be found in Lieut.-Col Hardie Neil's little book, "Field Ambulance Organisation," which sets out with a wealth of detail the routine work of an ambulance in the warfare of fixed positions such as existed in 1917. As the chief danger at Underhill Farm was gas, because it was in the heart of the artillery positions, very special gas proofing was provided for the reception chambers; and as events proved, the precaution was very necessary. As evidence of the solidity of this A.D.S. it may be cited that several direct hits by shells of large calibre were registered upon it without material damage resulting. The route of evacuation was by motor ambulance to Pont D'Achelles C.M.D.S. about four miles away, the roadway being fair, but at times impassable owing to shell fire or gas.

It would be tedious to enumerate the many minute directions and instructions issued as to personnel, equipment, and detail of evacuation. One or two points, however, may be mentioned as showing the extreme care and foresight exercised by the A.D.M.S. in making his arrangements as complete and harmonious as possible. Telephonic communication was made with the A.D.S.; to supplement this means of contact motor cyclists were also used as heretofore. Alternative sites for both A.D.S.'s were chosen before hand in case either became untenable. Special patrols of N.Z.M.C. orderlies each carrying stretchers and medical

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supplies, were detailed to the walking tracks so as to pick up any of the wounded who should fall by the wayside. All workers at the A.D.S. were instructed to make themselves familiar with the tracks and communications leading to the R.A.P.'s. Each motor ambulance was supplied with two drivers in case of casualty. The directions given to the R.M.O.'s were specially explicit: body armour, the "Dayfield" body shield, was to be worn by medical officers advancing behind the assaulting waves of their battalions. A steel chain vizier hanging from the rim of the helmet for the protection of the eyes had been experimented with, but found too inconvenient to wear as it added considerably to the weight of the helmet and interfered with vision. The special construction of the R.A.P.'s was designed to give protection to the medical personnel just prior to the final assault and later to serve as a retreat for wounded and ambulance personnel where they could shelter during the enemy counter barrage falling on our front line. The regimental medical officer on leaving the main R.A.P. at such a time as, barrage permitting, it seemed advisable to advance to his battalion headquarters, by now presumably established in or near the enemy lines, was to take with him three N.Z.M.C. bearers leaving one, a nursing orderly, behind in the old R.A.P. The ambulance bearers advancing with the R.M.O. were to act as runners: returning to the original R.A.P.—if necessary with an urgent stretcher case—they could act as guides to the newly established battalion aid post for the advancing bearers of the ambulances. By these means provision was made for continuous touch with the regimental medical detachment. The duties of the regimental stretcher bearers whose numbers were now increased to 48 per battalion (12 per coy. instead of 4), were to locate the wounded, place them in some position affording the best shelter available and ultimately to collect them at or near the R.A.P. As the enemy position was heavily trenched and had many concrete dugouts, some suitable positions were invariably to be found where protection or concealment were available. The instructions for intercommunication were that the R.M.O. should at the earliest moment after the establishment of the new R.A.P., generally adjacent to battalion headquarters, send back a written message to the A.D.S. at Kandahar Farm stating his location and the approximate number of stretcher cases requiring evacuation. In the case of the slightly wounded, when a dressing had been applied, a cross in blue pencil was to be marked on the bandage indicating that the wound was of such a nature as not to require redressing at A.D.S. In all cases where

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morphia had been administered by the R.M.O. the time of administration and the dosage was to be written in indelible pencil on the patient's forehead. If a tourniquet had been applied the word "tourniquet" in black letters was to be inscribed on the tally so as to give these cases a priority in despatch and treatment at A.D.S. Tallies when used, were to be signed by the R.M.O. and as far as possible all cases were to be tallied. This was not possible, of course in many instances as congregation of wounded and bearers about an exposed R.A.P. was not a safe proceeding: the unusual movement and assembly of groups of men was certain to attract artillery fire. For these reasons certain battalion commanders did not approve of the R.A.P. being moved forward during the early stages of a limited advance; they considered it preferable to leave the regimental medical establishment behind in the old R.A.P. at least during the first hours of the consolidation. As regards medical supplies, the following is a list of equipment furnished to each of the original R.A.P.'s:—1 medical companion; 10 stretchers; 300 shell dressings; 100 triangular bandages; 100 four-inch roller bandages; 12 petrol tins of water (chlorinated); 50 blankets; 2 bottles of brandy; 4 pounds of cocoa; 30 pounds of beef tea essence; 20 arm splints; 20 leg splints; 20 Thomas and Liston splints; 20 pounds of biscuits; 4 candles and 2 primus stoves. Ample reserves of medical supplies were kept at the A.D.S. to supplement their equipment, if necessary, and to replace expenditure: It was intended to use the permanent R.A.P.'s as advanced posts of the ambulance personnel under a forward evacuating officer as soon as the R.M.O.'s had taken up fresh quarters in the new positions.

Under the Corps Bureau system all the casualty returns were to be compiled at the M.D.S.'s the only documents to be forwarded by the A.D.S. parties were: four-hourly progress reports showing the numbers passing through and a nominal roll of enemy wounded dying in the A.D.S. For the purposes of facilitating the disposal of enemy wounded an interpreter was posted at each A.D.S.

The IInd Anzac Officers' Rest House at La Motte au Bois, under the command of Major Izard, N.Z.M.C., had by this date become an Army unit, and was now known as the Second Army Officers' Rest House. In anticipation of further demands for accommodation and for the reception of convalescent officers from the C.C.S. during operations, the bed state was increased to 75, the necessary quarters being taken over under army directions.

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Sanitary considerations had not been neglected in preparing the medical arrangements of the Flanders Campaign of 1917. A highly efficient reticulated water supply system had been provided for the Ploegsteert sector under army arrangements. There were many water points in the corps area supplied by this water system which covered a wide area of distribution and had its source in the Lys river. As the Lys water was normally heavily polluted, requiring 14 scoops for chlorination—which of course means quite unfit for drinking purposes—and yielding over 1000 total organisms per c.c. with *B. Coli* present in minimal quantities of the water, a system of purification and chlorination on a large scale was required. At the Jesus Farm across the river from Fort Rompu there were two large water filtration barges. Of these, No. 1—the Ransome-Ver Mehr Barge—was fitted with a streaming sand filter, and was designed for removing metallic poisons from water. Its output was 6000 gallons per hour and its powerful pumps were capable of distributing the flow to a wide area. On board was a chemical and bacteriological laboratory in charge of an R.A.M.C. officer. The No. 2 Barge—Bell System—was similar, although the treatment varied in detail and it had about the same capacity. Both barges were frequently visited by N.Z.M.C. officers attending the corps medical school at Estaires, during the winter. It is of melancholy interest to recall the fact that the gallant barges went down at their moorings, blown up by their crews rather than fall into enemy hands when the Germans crossed the Lys at Sailly in 1918. Other elaborate means of water supply were in use; the Water Tank Companies with motor clarifiers and carriers had been in the field since 1916. and were much in evidence before Messines in May, 1917, the "white dolphins" flashing past carrying 150 to 500 gallons of purified water to remote areas not supplied by the reticulation. Their presence indicated the possibility of a rapid advance into Belgium which in the area to be invaded was known to be very short of water during the late summer months. One section of a Water Tank Company comprising 41 motor tanks and clarifiers, yielding 4,350 gallons per trip was allotted to the New Zealand Division. Apart from the chlorination of all water supplies issued to the Division, special provision had been made by the Second Army to maintain a constant reserve of 30,000 sodium bisulphate tablets with each division. All medical officers were required to instruct the men under their medical charge in the method of using the water purification tablets whenever

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the supply of chlorinated water failed. About this time, cases for testing water for metallic poisons were issued to all regimental medical officers. The "Cases, Chemical, Water Testing," had already been authorised as a supply to Sanitary Sections and Field Ambulances by orders issued in December, 1915, but owing to persistent rumours that the enemy had used arsenic to poison water supplies in Flanders it was considered necesary that advancing troops should be supplied with this apparatus.

The new allotment of Sanitary Sections under Army control temporarily delegated to D.D.'sM.S. corps, had in view the adjustment of sanitary areas in re-occupied Belgium and immediate provision for adequate public health services in the case of a rapid advance until such time as the Belgian authorities were in a position to resume their functions. No more eloquent testimonial to the praiseworthy thoroughness of the medical arrangements can be cited than these sanitary provisions.

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CHAPTER XIII.

Messines.

During the three days that preceded the assault of Messines there was a final revision of the divisional medical arrangements. These busy days were known as "W," "X" and "Y" days, the attack was to be made on "Z" day and at "Zero" hour. The 4th of June was a bright, fine day, and was announced as "W" day; the attack would be on the 7th unless the Second Army saw fit to pospone it by adding further "W" or "X" days to the calendar. Something yet remained to be done: the New Zealand Stationary Hospital was still busily engaged in erecting Nissen huts at Hazebrouck and No. 1 New Zealand Field Ambulance was putting up tents at Ravelsberg, making preparations to receive and hold 750 patients. The 4th New Zealand Field Ambulance, which had arrived on the 1st of June, had orders to send one section complete to the M.D.S. at Westhoff Farm; and one section to the C.M.D.S. at Pont D'Achelles with the tent subdivision detached to a corps detraining point for lightly wounded at Connaught Siding close to Pont D'Achelles. The advanced parties of No. 2 Field Ambulance were moved into Kandahar Farm A.D.S.

On the 5th, a bright, warm day—"X" day in the battle calendar— there was an appreciable augmentation in the already voluminous output of the Corps artillery and an increase in the enemy reply. There was a conference of ambulance commanders in Colonel McGavin's office at the Divisional Headquarters situated in Westhoff Farm buildings. The A.D.M.S. of the New Zealand Division was now responsible for clearing not only our own divisional front but also for evacuating the wounded of the 4th Australian Division which was to "leap frog" through the 25th and the New Zealand Division in the final stages of the battle. Lieut.-Col. Murray, D.S.O., was placed in charge of forward evacuations at Kandahar Farm, and Lieut.-Col. Hardie Neil with his 3rd Field Ambulance was to proceed immediately to Underhill Farm A.D.S. All the motor ambulance cars of the division were to concentrate at a parking station near Neuve Eglise. During the course of this conference a strange disaster befell at Ravelsberg where the 1st Field Ambulance had their

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enlarged D.R.S.: an enemy aircraft landed a bomb on an ammunition dump at "York" Railway Siding quite close to the ambulance; an ammunition train caught fire and heavy and continuous explosions of shells followed for many hours wrecking part of No. 1 Field Ambulance and killing several civilians whose houses were adjoining. The horse lines of the field ambulance were only 50 yards away and were in considerable danger. Shells of every calibre were exploding in rapid succession—large jagged fragments were hurtling through the air in all directions—in the branches of a tree overlooking the horse lines hung the mangled body of a civilian, blown up there by the first explosion. But our A.S.C. men stood to their horses, and under the directions of the N.C.O.'s led them away to a place of safety; losing only some harness, which was burnt with one of the sheds. The ambulance was obliged to clear its personnel and patients, as debris and fragments of metal were flying or falling through their huts and tents. There were no casualties, except to civilians, whose houses adjoined the railway siding. It was a bad start for a shell shock hospital, and several of the nervous cases received an additional psychic trauma for which they had to be evacuated. The dump burned and exploded intermittently for about 36 hours. The transport N.C.O.'s had due recognition of their plucky work in saving the horses. During that night there was more trouble, this time at Kandahar A.D.S., and at Underhill Farm. Heavy gas and H.E. bombardments were causing casualties in the gun teams. At Underhill, the motor drivers of the 3rd Field Ambulance took their cars through the gas with respirators on, a particularly difficult feat; more especially as the road was, in places, ploughed up by shell holes. Only one N.Z.M.C. casualty resulted: one of the bearers fell into a shell hole and was gassed.

The 6th of June "Y" day, a dull morning with oppressive heat. Zero hour had now been fixed for 3.10 a.m. on "Z" day; the divisional orders for the attack were issued. The Second Army's medical arrangements were fully completed: the 4th C.C.S. at Baillieul and the 2nd Australian C.C.S. at Trois Arbres destined to serve the IInd Anzac Corps, had each been strengthened by 3 extra surgical teams, 3 additional M.O.'s and from 6 to 12 sisters, besides added bearer personnel up to 60; 16 ambulance trains or temporary ambulance trains were drawn up on the Second Army sidings. The D.M.S. had visited the New Zealand Stationary Hospital and found that it could now accommodate 1000 cases if required; there were 54 wounded and 133 sick in the unit at this date. Colonel Begg summoned a

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meeting of his A.D.'sM.S.; matters of importance were discussed: the specially devised gas administration apparatus known as the "Novita" set was fully explained and demonstrated; some final instructions from the Second Army as to the surgical treatment of wounded were discussed and the new method of disposal of "shell shock" cases was defined. Cases of "shell shock" admitted to field ambulances were to be classified in two categories:— (1) Those with obvious shell shock who were to be evacuated to C.C.S. with the diagnosis N.Y.D. (not yet diagnosed) shell shock; (2) Doubtful cases including: exhaustion, nervousness, possible malingering; these were to be diagnosed as "Exhaustion" and sent to D.R.S.'s.

During the day, Lieut.-Col. Murray, D.S.O., with bearer officers and N.C.O.'s from Kandahar Farm visited the various posts and reconnoitred the communications, the trench tramways, and the overland routes, which were now flagged and marked by direction posts and illuminated signs for use at night. All the available bearers of No. 1 and No. 2 Field Ambulances were assembled at Kandahar Farm and the allotted N.Z.M.C. personnel sent forward to the R.A.P.'s, the bearer relay posts, and the Divisional Collecting Post at Leeuwerck Farm.

The Corps Main Dressing station at Westhoff was fully manned, the total personnel under the command of Lieut.-Col. H. B. Kelly, R.A.M.C., of the 77th Field Ambulance, comprised: 15 medical officers, 260 O.R., made up of tent subdivisions from the 25th and the New Zealand divisional ambulances with added stretcher bearers supplied by the 4th New Zealand Brigade. The Westhoff station was organised in three departments: corps walking wounded collecting post; corps main dressing station; and the corps clerical bureau. There was a well equipped operating hut, a resuscitation room, a room fitted with "Novita" sets for the treatment of gas casualties and a small surgical ward with a few beds; in all, there was accommodation for 600 lying and 700 walking cases.

"Y" day was an oppressive day, but a thunderstorm cleared the air; the afternoon was cooler; the night fine with a full moon. At dusk, under the protection of our fighting aeroplanes, the three assaulting columns of the 25th, the New Zealand, and the 3rd Australian Division, moved into their assembly trenches. The first two divisions had no casualties during this manoeuvre, but at 9 p.m. a heavy gas bombardment caught the Australians; two of their battalions had serious losses from gassing. The gas proof arrangements at Underhill Farm acted well: the doors

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constantly sprayed with anti-gas solution permitted the staff within the chambers to work without box respirators—an enormous advantage as prolonged work in a mask produces considerable fatigue and early exhaustion. At the A.D.S. at Kandahar Farm, many gassed men from the neighbouring batteries were admitted, and at midnight, an ammunition dump in close proximity to the farm exploded. Everywhere in the forward areas there was heavy shelling of roads and communications. Gas everywhere was plentiful. All the N.Z.M.C. bearers in the relay posts were obliged to work in box respirators; the gas, favoured by a "dangerous" wind, permeated the whole area, and, even at the Westhoff C.M.D.S., was definitely perceptible. At midnight there was a lull.

"Our R.A.P. was at a place called Fort Osborne"—writes Captain Johns of 1st Canterbury—"we were about 500 yards behind our front line. The 2nd Canterbury M.O., Captain Gordon, N.Z.M.C., shared this same dugout with me. The battalion got in without mishap although the enemy were putting a few gas shells over. It was about 11 p.m. when we arrived; we set our gear in order and waited about until the show started. There was just the normal artillery fire going on, and the Boches had not the faintest idea what was going to happen to them at 3.10 a.m., or that there were thousands of troops massed in the trenches where, usually, there were only a couple of battalions. We had been warned that our people were going to blow mines at zero hour, so at 3 a.m., we got out of the R.A.P. and lay down on the ground behind the trench. Precisely 10 minutes later the whole show was pandemonium, 19 mines along the front went up together, thousands of guns of all sizes and shapes went off as hard as they could lick, besides hundreds of machine guns. The ground rocked for about ten minutes like an earthquake, and in the Boche line there appeared to have been a volcanic eruption. At the same moment our men in the front line trenches jumped out and it seemed as if thousands of living men had suddenly grown out of the ground. They were across No Mans' Land before the Boche got his barrage to work. The casualties were very light and were chiefly due to the men being too eager and getting into our own barrage. We got busy about 4 a.m., the greater number of the wounded were walking cases. Owing to the gas shells we had to knock off once or twice as we could not work properly in the box respirators."

At "zero" the 3rd Brigade on the right and the 2nd Brigade on the left had crossed the parapet—the 1st Brigade at present in

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reserve following up—the enemy's barrage fell on our old front line, ragged and thin; but all waves were across No Mans' Land before it opened. In 20 minutes the German front and support lines were captured and the New Zealanders were going on straight through Messines, headed by a wall of living fire fed by our guns. So rapid was the advance that the 12 tanks detailed to assist could not hope to keep up with the infantry.

There were three R.M.O.'s working at Fort Osborne at the time of this assault besides Captain Johns: Captain Gordon, 2nd Canterbury; Captain Connor, 1st Wellington and Captain Goldstein 2nd Wellington. The first cases to come down were walking cases who were directed to King Edward Sap and Medicine-Hat trail. The stretcher parties from the bearer relay posts arrived prior to 4 a.m. and at first found some difficulty in using the trench tramline for stretcher cases owing to damage to the ways by shell fire, and the passage of our tanks; but German prisoners were coming in, and, with their assistance, some of the earliest of the lying down cases reached Khandahar Farm just after 4 a.m. At 4.30 the first casualties from IInd Anzac Corps were already in C.C.S. The wounded, now, were being carried by hand by the overland route along the trench tramline to the bearer relay posts. Some of the R.M.O.'s were already moving forward to the newly gained trenches and, at 5 a.m., Captain Addison, N.Z.M.C., R.M.O. 2nd Auckland, had opened an R.A.P. at the Moulin de L'Ospice near Messines. This was the first R.A.P. to be established, and many wounded from all units were dealt with there. At 6.30 a.m. Messines village was clear of machine-gun nests, the divisional objectives were being consolidated, and the Engineers were hurriedly repairing the road so that lorries and the Ford ambulance cars were now able to get up as far as Boyle's Farm. Up to this time 168 wounded had reached Kandahar Farm, of which 30 were lying down. The corps M.D.S. at Pont D'Achelles had received 500, of which 200 gassed from the 3rd Australian Division. Everywhere evacuations were proceeding with extraordinary rapidity. From 5.30 to 7.30 the enemy barrage had somewhat impeded work at Fort Osborne, sparse shells were falling in the communication trenches, three bearers were wounded, but after this, for some time, no trouble was experienced. No doubt the Bavarians were retiring their field guns. The attack so far had succeeded with machine-like precision; the medical arrangements resembled the military movements in time-table punctuality; the first ambulance train steamed out of Baillieul at 7.30 a.m. A steady flow of stretcher

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cases was coming down mostly to Fort Osborne, some to Boyle's Farm where R.M.O. 1st Otago, Captain Prior, was working. Captain Connor, 1st Wellington, now pushed forward and established a new post 500 yards east of Boyle's Farm, about the time that his battalion was moving into the most advanced lines to be held by the New Zealand Division. By 8.30 the final objectives of the division were being consolidated by the 1st Brigade which had passed through the other two. The casualties reported so far were 1,200, including a few wounded Germans admitted to the corps M.D.S.'s; the light and broad gauge railways were working well; the walking wounded entraining like a holiday crowd.

By 10 a.m. most of the R.M.O.'s had advanced their R.A.P.'s to dug-outs or trenches in and about Messines, and were in touch with the A.D.S. at Kandahar, stretcher parties had reached them and were clearing their wounded. The numbers of wounded passing through the A.D.S. had diminished somewhat. R.M.O. 1st Otago, Captain Prior, who was known to have advanced earlier, had not yet been located, and later it was reported at the A.D.S. that the first runner sent back by Captain Prior had been killed not far from the R.A.P. east of Messines. The second messenger, more fortunate, brought the map reference of the new R.A.P. safely to the A.D.S. Another R.M.O., Captain Nelson, of 1st Auckland, was not located, he had moved away early with his battalion and had established his R.A.P. well forward of his battalion headquarters, south-east of Messines, and about a mile from the old R.A.P. at Surrey Farm. Here in some German dug-outs, he was for a time overwhelmed with wounded, and quite out of touch with the N.Z.M.C. bearers.

At 12 noon the Division was well established: they had taken 300 prisoners, many machine-guns, and some field pieces. 2,200 wounded had passed through the corps stations in the proportion of one lying to three sitting; stretcher cases were coming in from forward R.A.P.'s which were mostly clear, with the exception of 1st Auckland. The ambulance parties were now taking over the old R.A.P.'s, Boyle's Farm and Fort Osborne, as advanced dressing stations under Captain J. G. Crawford, N.Z.M.C. of the No. 2 Field Ambulance. Up to midday 789 wounded had passed through Kandahar Farm, of which 300 walking, 188 lying, 243 sitting; 58 German wounded not included. The bearers of the 12th Australian Field Ambulance were moving up to the old R.A.P.'s to participate in the forward move of the 4th Australian Division to the final positions at 3 p.m. There was

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a barrage falling about the advanced R.A.P.'s a few shells bursting on the Messines road which the motor ambulance cars were lucky to escape.

Captain Johns' narrative continues:—"About mid-day things were getting a bit slack and the ambulance came along to form an A.D.S., so Gordon and I thought we had better get off to Messines to pick up our battalions. The Germans were still dropping a few shells over the place at haphazard as they had lost all observation. We went up by leaps and bounds and I got up to my battalion safely. I found one company digging in. We discovered a line of German dug-outs and occupied them. I went forward to my headquarters which were a few hundred yards ahead. Here I learnt how things were going and, as I was sitting at the table, I was so dreadfully tired, I must have dropped asleep." Major Johns was known as "très calme," in his battalion; while he was sleeping a 5.9 shell hit the battalion headquarters: it was a solid structure and suffered no damage, but the place was attracting too much attention; consequently the party moved out. Captain Johns went back to his line of dug-outs, where he attended to his wounded, later had a meal and fixed up some sort of a bed for the night.

After 1 p.m. the Germans launched their counter attack, accompanying it by a very heavy barrage on Messines; shells of all calibres up to 8in. were falling in profusion behind our advanced positions. But the assaulting waves of the 1st Guards Division and the 24th Bavarian Division melted under our counter barrage, and we took some prisoners from both divisions who had come up by train from Tourcoing and Haubourdin. Shortly after the 4th Australian Division "leap-frogged" through us to the Oestaverne line, the final objective of the Anzac Corps. During their advance it was almost impossible for the N.Z.M.C. bearers to reach the new R.A.P.'s owing to the barrage which caused many casualties. A sleepered track made by the Engineers, early in the forenoon, led on past Spring Street R.A.P. and by 11 a.m. a Ford car had penetrated as far as this post. Later, a service of motor ambulance cars was established to Spring Street; but regularity could not be maintained as the track was subject to heavy shelling, more especially in the afternoon.

From 5 p.m. onwards there was desperate fighting on our front the 4th Australian Division and the tanks were meeting opposition in the capture of the final line. Cavalry patrols of the Otago M.R. went out to reconnoitre the position, but lost most of their horses. The "situation was obscure." A thick

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curtain of fire was falling in the Steenbeck Valley west of Messines. Shortly after 5 p.m. the D.D.M.S. had visited both the A.D.'sM.S. and the corps stations and was assured that every arrangement made was working smoothly. Colonel McGavin went out to the advanced dressing station at Kandahar Farm where by this time 648 wounded had passed through; and 375 walking wounded at the divisional collecting post. Extra stretchers and blankets had reached the new R.A.P.'s prior to this. There was some congestion of wounded at Westhoff M.D.S. caused by a block of the M.A.C.: over 80 stretcher cases, dressed and fed, awaited evacuation and there were about 300 German wounded still to be attended to, mostly walking cases. The block was at the C.C.S.'s in Bailieul where the spate of wounded so rapidly evacuated from the forward zone was held back by surgical necessities—the cars could not unload—the stream of wounded was now temporarily directed by Colonel Begg, to Pont D'Achelles Corps M.D.S.

At 7 p.m. it appeared that the 4th Australians were in their appointed positions, and as they were now in front of the New Zealand Division, Australian bearers replaced the N.Z.M.C. parties in Boyle's Farm and Spring Street. Here, the 4th Australian Field Ambulance relieved men of the New Zealand Field Ambulance whom they had not met since April, 1916, when they parted from a comradeship much cherished from Anzac days. Large N.Z.M.C. bearer parties under Captain Crawford, N.Z.M.C., now went out to clear the advanced R.A.P.'s—a difficult task, owing to the barrage on Messines and in the valley. As night fell, conditions of uncertainty and anxiety prevailed, heavy local counter attacks had to be met in the front line, the exact position of which was not determined at all points. The situation became more complicated by subordinate commanders, fearful of the safety of their own lines shortening their barrage, so causing casualties to the Australians in front, and ill luck had decided that both the enemy and ourselves were using identical star-shell signals for artillery support. It was impossible then for our observing officers to distinguish our own S.O.S. signals from those of the opposing infantry. The losses amongst the Australians from all these causes were very considerable.

About midnight the most forward R.A.P.'s were cleared by the ambulance bearers. There had been casualties: of the Australian bearers, 4 killed and 3 wounded; the N.Z.M.C. parties had, so far, 1 killed, 7 wounded, one R.M.O., Captain Prior, gassed. The wounded of the New Zealand Division, evacuated up to midnight,

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totalled: 60 officers, 1,884 O.R.; of these Kandahar Farm had tended 993, Underhill Farm, 600. Over 150 walking cases had passed through the divisional collecting post without calling at either of the A.D.S.'s. In the casualty clearing stations, at Baillieul, there was great congestion, so many of the wounded required operation; the surgical teams could not keep pace with the incoming casualties. In order to relieve the pressure, 100 stretcher cases, mostly gunshot injuries of the head, were despatched by M.A.C. to the New Zealand Stationary Hospital at Hazebrouck, where they arrived at 4 a.m. on the 8th. During the first day this unit had admitted 10 sick and 187 wounded.

All through the night of the 7th and early hours of the morning of the 8th ambulance bearer parties, New Zealand and Australian, were carrying from the forward R.A.P.'s to Boyle's Farm or to Spring Street both points now used by the A.M.C. as A.D.S.'s. There was intense work going on behind the captured positions: parties with pack-mules carrying water, food, ammunition, and all manner of trench stores were hurrying up and down with ant-like industry between the dumps and the newly acquired positions. The N.Z.E. were laying down sleepered tracks, building temporary culverts, supervising the construction of a sap through No Mans' Land, improving the old enemy communications. By daylight they had completed a mule track as far as the Moulin de L'Ospice on the western fringe of Messines, in which neighbourhood at least four R.M.O.'s were working. Not many casualties were reported in this group of R.A.P.'s during the night. Captain Johns tells us, that, having made his bed he slept in it only to be awakened by a large shell, "which had burst at the corner of the dugout and made a hole big enough to bury a bullock in, but the old dugout stood it well. The Huns like the Egyptians, built their 'pill boxes' to last for eternity." At dawn he was awake, he tells us, had a wash, shaved, attended a few wounded, breakfasted and admired the view, notably the work of the Maori Pioneers, heroic wielders of the shovel, who had driven a sap almost up to his dugout.

By sun up on the 8th, all R.A.P.'s were reported clear of wounded; over 2000 had passed through Kandahar Farm, of which 670 were stretcher cases. Spring Street R.A.P. was now connected with Messines by a road repaired during the night, and the motor ambulance cars were able to load stretcher cases here, as the sleepered track from Kandahar Farm was quite satisfactory except at the times when it was barraged. The A.M.C. bearer parties despatched from Spring Street followed the

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mended road which led past "Stinking Farm" and "Gooseberry Farm" to our old front line, thence across country to the eastward group of R.A.P.'s. Had they followed the road it would have led them up Messines Hill to the site of a cabaret, "Au Bon Fremier," where the mended road joined the Ploegsteert road and ended in the Grande Place at the Institute Royale in Messines. It was quite close to the cabaret site that Captain Johns and Captain Gordon had established their R.A.P.; away some 200 yards to the left of them was the Moulin de L'Ospice, used by the Germans as a strong point and adjacent to the Wulverghem road as it entered Messines at its northern extremity. To their south, down in the Douve valley, and eastward of them in an old German support line, known on our trench maps as "Ulcer" support line, was Captain Nelson's R.A.P. in a concrete dugout. The Australian R.A.P.'s were considerably to the east of Messines in the German second line trenches, over a mile and a half from Spring Street. In closely searching the ground for outlying wounded near these exposed posts considerable risk had to be run by our bearer parties, well led by Captain Aitken of the 1st New Zealand Field Ambulance; repeatedly his squads passed through the barrage; carrying out over the badly broken ground large numbers of stretcher cases, mainly from the 4th Australian Division and some from Captain Nelson's R.A.P. Many of the wounded had injuries of a severe type, caused by the large calibre shells used during the German counter attacks. The German wounded, now brought in, were very serious cases and some, who had been lying out since the previous dawn, had commencing gas baccillus infection. In dealing with the enemy wounded at the A.D.S. the interpreter was a great help. Amongst the miscellaneous information obtained by him was the fact that the main German aid post which was situated just behind the Institute Royale in the Grande Place and sheltered two German medical officers, had been completely demolished by one of our heavy shells which killed both the officers and their orderlies. This accounted for the fact that no German medical officers were found by us in the village.

During the forenoon, Sir Anthony Bowlby visited the corps M.D.S.'s and expressed great satisfaction with the conditions of the wounded tended there. The Thomas hip splint was largely used and unquestionably saved many lives. The weather, too, being very warm and dry was most favourable to the seriously wounded. At the New Zealand Stationary Hospital "head" cases had been coming in since the night of the 7th. Relays of

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operating teams were working day and night. Dr. Harvey Cushing, one of the vanguard of the U.S. Medical Corps, was for a time assisting in the work. Both operating theatres were required and were used by three teams, each working in eight hour shifts. The majority of the cases had compound fractures of the skull without peneration of the dura. X-rays were used, where possible, in all cases. The operative methods adopted consisted in: excision of the scalp wound, enlargement of the opening in the skull, removal of depressed fragments of bone and foreign bodies where accessible; arrest of haemorrhage, the application of B.I.P., and closure of the wound without drainage. The great majority of the wounded required operation. The immediate mortality of the "head" cases was 24 per cent; of the abdominal wounds subjected to operation, 75 per cent.

By 12 noon a readjustment in the New Zealand divisional front became necessary in order to avoid a serious congestion of troops. The 3rd Brigade was to be withdrawn to Hill 63 and placed in reserve; the 1st Brigade would hold the New Zealand line with the 2nd Brigade in support. In front, to the east of Messines, the 4th and the 3rd Australian Divisions were now linked up in a fairly solid position. Throughout the afternoon there was no change on the New Zealand front, but the enemy fire was slowly increasing in intensity, and after nightfall became very violent; a counter attack was said to be in progress. Again the 4th Australian Division had heavy casualties, in some instances from our own protective barrages. Up to midnight there were alarms and excursions, and in the midst of this hubbub parties of bearers led by Captain J. G. Crawford, N.Z.M.C. set out to clear the forward R.A.P.'s. All through the troubled night they worked, bringing in some 34 stretcher cases at no little risk, and with much difficulty. The brutal distortion of the crater area over which they worked may be imagined when we read that, in our preparatory bombardments, no less than five and a half tons of high explosives had been thrown by our guns into every yard of frontage of the German defences. By night the difficulties of the bearers stumbling through with heavily laden stretchers were increased tenfold by alternate flashes of brilliant lightning from bursting shells succeeded by moments of blinding darkness. The German guns fired heavy salvos behind our front line all through that night, but towards dawn the barrage abated, by which time all wounded were safely brought in to Spring Street and had been loaded on cars for Kandahar Farm.

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By 6 a.m. on the 9th, 1121 walking, 799 sitting, and 1029 lying, wounded had passed through Kandahar Farm; a heavy proportion of stretcher cases. The New Zealand wounded amounted to 80 officers, 2460 O.R. A bright warm day, wind rather strong—the military situation fully cleared up by aeroplane reconnaisance. At midday, the 1st New Zealand Brigade had orders to come out of the line and retire to rest billets. All R.A.P.'s were clear in the afternoon, when Lieut.-Col. Murray handed over Kandahar Farm to the 4th Australian Division; his tally of wounded passed through now reached 3126. The bearer personnel of No. 1 and No. 2 Field Ambulances were relieved by A.M.C. and marched to Ravelsberg for a period of rest, having worked almost continuously for three days and nights. No. 3 New Zealand Field Ambulance passed under control of the A.D.M.S. of the 4th Australian Division, now responsible for forward evacuations. Owing to the direction taken by the trench tramways, and the general use of the Wulverghem road, most of the New Zealand casualties had passed through the northern sector, but at Underhill, some assistance was given to the 3rd Australian Division whose A.D.S. was near by at Charing Cross and was occasionally overcrowded.

During the night of the 9/10th, the Division was relieved. The day was quiet, Divisional Headquarters moved into Baillieul. The 4th New Zealand Brigade which had not yet been engaged in the fighting line passed to the control of the 4th Australian Division, taking over a sector of the line just north of the Lys, the Ploegsteert-Le Touquet sector already described. The 4th Field Ambulance established a M.D.S. at Pont de Nieppe, using the routes of evacuation from Motor Car Corner and the A.D.S. at the Brewery.

The second battle of Messines terminated on the 9th of June, what further operations ensued, in advancing our out-post line belong to a period of exploitation of the initial success. With these operations we will deal later, but the moment seems opportune to review the medical work during the assault and capture of the village by the New Zealand Division.

All contemporary accounts written by medical officers agree in stating that the medical arrangements worked satisfactorily. There were some minor imperfections however. First, as to the R.M.O.'s: the position of the regimental medical detachment in the course of an assault is to a great extent a matter for the battalion commander to decide, although divisional routine orders issued at the Somme governed the dispositions somewhat; but,

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in the assault of Messines the 1st Brigade, as it passed through the 3rd and 2nd Brigades to the east of the village, carried the regimental medical officers forward with, or shortly after, the infantry waves. The N.Z.R.B. kept their regimental aid posts for some time in our old front line, and this, as we have seen, applied also to the 2nd Brigade; their objectives were not so far off as those of the 1st Brigade. The advance of one of the regimental detachments of the 1st Brigade, then, can be reviewed as an illustration of similar movements in other battalions.

Captain Nelson, N.Z.M.C., R.M.O. to the 1st Auckland, was in the assembly trenches in front of Spring Street, at zero hour. He advanced with the final waves of his battalion, having with him 4 regimental stretcher bearers, his corporal medical orderly, 1 regimental water duty man of the N.Z.M.C., 1 N.Z.M.C. runner, taken from the old R.A.P., and the battalion chiropodist. He kept close touch with his battalion headquarters detachment. He reached the enemy trench known as "Ulcer" support without casualties, but did not at first occupy the trench. He dug in his R.A.P. in a shell hole—his party carried spades, and were able to improve the position somewhat. Here he attended to such wounded as were in his vicinity and at 5 a.m. despatched his runner to Spring Street. There was no shell fire for about two hours in this locality and at 6 a.m. one squad of N.Z.M.C. bearers cleared his post of stretcher cases which only numbered two. Just before midday he went forward about 200 yards and found a strong concrete "pill box" in "Ulcer" Sap. The dug-out was full of dead and wounded Germans; the dead were removed, the wounded attended to. During the day no bearer parties had penetrated to this post, now over a mile from Spring Street, on the extreme right of the New Zealand Division and the most advanced R.A.P. Some time after the assault of the 4th Australian Division returning German prisoners were commandeered to carry back the accumulated stretcher cases, but it was not until 9 p.m. that Captain Nelson's post was finally in touch with Australian bearers going forward to their own still more advanced posts. After this there was no further trouble, the N.Z.M.C. officers were now fully informed as to the position. In the morning, water supply was a difficult problem, but some water was obtained from a disabled tank and later a pipe supply from Messines was discovered near the pill box. During the 8th and 9th many Australian wounded were brought down to Nelson's Post and Captain Crawford, in person, brought up bearer squads on the morning of the 9th. The regimental stretcher bearers had

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very heavy casualties as there was much enemy artillery fire and most of the time a heavy barrage between the post and Spring Street. Captain Prior, R.M.O. 1st Otago Battalion was for a short time not located but he was in touch at a much earlier hour than 1st Auckland. Generally, touch was maintained with much greater ease than at the Somme, and, with the exception of Nelson's Post, all R.A.P.'s were kept clear at all times. Only the wounded who were lying in shell holes were difficult to locate, and late in coming in. At some R.A.P.'s there was much less work than at others. Captain Johns and Captain Gordon at the Cabaret corner had few casualties, mainly because they were too near to Messines, which was subjected to a withering bombardment from the Le Quesnoy group of heavy field guns, whereas 200 yards north of them, Captain Addison, N.Z.M.C., at the Moulin de L'Ospice attended a great number of wounded from all units. The fortified R.A.P.'s in our old front line positions were a tower of strength in the evacuation scheme, but it was thought by some of the R.M.O.'s that bearer relay posts should have been advanced beyond these points. The A.M.C. parties did push forward their B.R.P.'s after the 7th, as they had a longer carry to negotiate.

Lieut.-Col. Murray's contemporary report on the work at Kandahar Farm has some interesting passages. He says.—"Throughout the whole of the operations evacuations proceeded satisfactorily, the wounded coming in very quickly. There was little holding up of wounded forward of the A.D.S., and very few cases that had not been brought in within 24 hours. Later on in the operations a few wounded were located in shell holes where it was very difficult to find them, or, in some instances, to approach to their assistance owing to severe shell fire. The trench tramways were of much assistance in evacuating from Spring Street and Fort Osborne. Each trolley had been adapted by special gates to carry four stretcher cases; only three bearers were required to handle the load. The specially constructed protected aid posts, roomy and well equipped with all necessary medical stores, staffed by N.Z.M.C. nursing orderlies, were of the greatest assistance to the R.M.O.'s who were enabled to work expeditiously and safely, and later advance to their forward aid posts with the battalion medical equipment intact and unopened. The field ambulance runners were well used to maintain touch with the advanced dressing station by accelerating the despatch of bearer parties to an already known point. Occasionally, owing to heavy hostile artillery fire it was not possible, within the bounds of reasonable safety, for bearers and wounded, to clear

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some of the forward posts, and a pause in the work was necessitated until fire ceased or slackened. Thomas' hip splints were largely used and unquestionably enabled the transportation of men with fractured thighs to be carried out with the minimum of shock. Hot restorative drinks and food were given to all cases at the A.D.S. prior to dressing and evacuation. Along the walking wounded tracks, refreshment points were provided by the New Zealand Y.M.C.A. or the field ambulance personnel; here hot drinks and biscuits were available."

A small detraining point for lightly wounded coming down by the 60 c.m. railway was established by one tent subdivision of the 4th New Zealand Field Ambulance. It was near Connaught siding on a track leading to the C.M.D.S. at Pont D'Achelles. During the Messines operations some 900 walking wounded detraining at this station were fed at a long counter in the open, their wounds redressed and their progress assisted to the Pont D'Achelles station. During the afternoon of the 7th a 12in. gun of ours drew up near the siding and engaged with a similar monster in the Lille defences in a very noisy and alarming duel the effect of which was, if anything conducive to accelerated evacuations.

The A.D.M.S. of the New Zealand Division, Colonel McGavin, was responsible for clearing both the New Zealand and the 4th Australian Division from zero hour up to the 9th of June. He had under his command the whole of the bearer personnel of the Australian Ambulances from 3 p.m. on the 7th until relieved by the Australian A.D.M.S., Colonel Barber, A.M.C. Colonel McGavin makes the following comments in his report written shortly after the engagement. "The total number passed through the advanced dressing stations in the period defined was as follows:—walking wounded, 980; sitting wounded, 1620; lying wounded, 1230; total 3830 (including P.O.W.). The protected A.D.S.'s and R.A.P.'s were very efficiently fortified; several direct hits by 5.9 or 4.2 shells were noted, but in no case did the shells penetrate the dug-outs. The gas-proofing proved very effective at Underhill Farm, the neighbourhood of which A.D.S. was subjected to heavy bombardments by gas. Dayfield body shields were furnished for all medical personnel, but were mostly used by those who were working about the A.D.S.'s and the R.A.P.'s and by the drivers of the ambulance cars, that is to say: by those who, not having to move about a great deal, were not unduly hampered by the extra weight. Five men were hit on the body shields, in four of these cases there can be no doubt that the wearers were saved

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from dangerous abdominal or chest wounds. The A.D.S. of the right subsector, Underhill Farm, was prepared to deal with many more cases than, as a matter of fact, passed through it. This was anticipated, but it was considered advisable to provide ample accommodation here in case the enemy fire should prevent access to or evacuations from Kandahar Farm; in which case, the greater part of the evacuations would have been conducted through the alternative route in the right subsector. Telephone lines to each A.D.S. proved invaluable. The wire to Underhill Farm was several times broken by shell fire, but was speedily repaired. Despatch riders (motor cyclists) did excellent work in maintaining communications and supplementing the telephones. The motor ambulance cars of both divisions with the exception of a few stationed at A.D.S.'s were parked near Westoff in charge of a N.Z.M.C. officer [Captain Mitchell, Q.M. of No. 2 New Zealand Field Ambulance]. A continuous circulation of cars from the A.D.S.'s to the C.M.D.S. was maintained; the numbers of cars required at any one time being controlled by telephone or despatch messages from the A.D.S.'s so that varying requirements were rapidly met. Valuable services were rendered by the New Zealand Y.M.C.A. under Mr. J. L. Hay, who established refreshment stalls at certain points along the routes of evacuation, even as far forward as Boyle's Farm and Gooseberry Farm." The A.D.M.S. reports the casualties of the New Zealand Division admitted to the corps M.D.S.'s from midnight on the 6/7th June to midnight on the 9/10th as 22 officers, 2840 O.R. and the casualties in the N.Z.M.C. as killed, 1 O.R.; wounded, 22.

At the corps M.D.S. at Westhoff the work had been shared by three departments: walking wounded under N.Z.M.C. officers; stretcher cases tended by British and New Zealand details; and the clerical section—corps casualty bureau—by a mixed detachment of clerks. In the stretcher case department three large hospital huts with four tables each were manned by shifts of six medical officers, one to every two tables. Smaller huts on the opposite side of a plank walk provided an operating theatre, a gas treatment room and a resuscitation room. A large hut controlled by a senior N.C.O. was in use as an evacuation room for stretcher cases. The three large hospital huts used for lying down cases gave on the admission road and received the stretchers in turn or simultaneously as desired. A heavy curtain of blankets separated the receiving from the dressing subdivision of the hut and in each hut the chaplains and orderlies saw to the immediate comfort of the wounded as soon as they were admitted. Four

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trestles were loaded at a time, each had a nursing orderly in charge, whose duty it was to prepare the wounded for the surgeon's inspection. Two bearers assisted in removing or cutting out clothing, boots, or in other necessary rough work. A clerk entered the particulars of each case on a buff slip and prepared the field medical card for the medical officer's notes. Next a special orderly in charge of the serum, administered the anti-tetanic injection, and lastly the case was examined by the surgeon. Where there was free haemorrhage or considerable shock, the case was immediately transferred to the operating room, but in the general run of cases the surgeon once satisfied as to the nature of the injury, gave necessary instructions to the nursing orderly and dictated to the clerk the description of the injury to be entered on the field card. If the wound required splinting or was at all extensive, the surgeon applied the apparatus and dressing himself, but in very many cases this was not necessary as the nursing orderlies were expert dressers, so that by the time he had examined one case his other table was occupied and ready for his attention. In this way and by strict adherence to a well rehearsed drill, and carefully ordered dressing and sterilizing tables, a maximum of work could be put through in an incredibly short time. Gloves were used by some of the staff, not all; masks were not used; all were clothed in sterilized gowns. In many instances the wounds had been very well dressed and the case carefully splinted at the A.D.S., nothing was required here except the anti-tetanic serum and the necessary clerical work. Cases coming down in this condition from the A.D.S. had their bandages marked in indelible pencil with the sign "O" meaning "O.K. C.C.S." and were not disturbed but passed straight through to the evacuation room. The first field dressing, if not removed at A.D.S. was always taken down at M.D.S. so that a full description of the wound could be recorded; a very necessary precaution, as wounds of a trivial nature are not easily distinguishable from more serious penetrating injuries, especially where small fragments of high explosive shell are concerned.

In the operating department tourniquets if present were removed. Ether by the open method, was administered and haemorrhage was arrested by ligation *in situ* or by amputation in the case of badly shattered limbs. Chest wounds were closed by suture without an anaesthetic. Abdominal cases were not handled but were sent on urgently—frequently from A.D.S.—by direct car to C.C.S. The operating team of three medical officers

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assisted by skilled nursing orderlies, also attended to resuscitation by warmth, stimulating drinks and intravenous injection of hypertonic saline solution with added calcium chloride; camphor and small doses of morphia were administered, all shocked cases were detained until they had rallied. Moribund casualties were admitted to a small comfortable hut, named euphemistically the "surgical" ward, where the chaplains ministered to them to the end. The splinting of compound fractures or of extensive flesh wounds of the upper or lower limbs was occasionally much facilitated by light ether narcosis, the dose of morphia already administered permitting good relaxation under the anaesthetic. In spite of the general interdiction of anaesthetics at M.D.S. the advantage to the patient of having good extension and immobilisation in a well adapted splint appealed strongly to the forward surgeons as a preventive measure against pain and shock in transport and handling prior to operation at C.C.S., which for a variety of reasons, might not be for many hours after the first adequate dressing had been applied. If it were not for the danger of early gas infection many of these cases, put up handsomely at M.D.S., might have embarked in ambulance trains direct for general hospital without risk in transit; but it had been noted on the 8th and the 9th, more especially in German wounded who had been lying out undiscovered for many hours, that gas gangrene developed in from 18 to 36 hours after receipt of injury.

In the dressing of minor wounds iodine was not used; sterilized gauze with eusol was the universal dressing. Picric acid in two per cent. solution with methylated spirit was applied to the scalp, after shaving, where there was a penetrating injury of the skull. The most interesting advance in first line surgery was the extensive use of Thomas' hip splint as far forward as the original R.A.P. The difference in condition between wounded who were thus splinted and those otherwise dressed, was very striking. All medical officers commented on the vast improvement effected by the use of this apparatus in handling a condition heretofore fraught with extreme danger to the injured. Some of the R.M.O.'s were of the opinion that a supply of these splints should have been brought up to the forward R.A.P.'s by the ambulance bearer parties; in this contention they were right; the idea was developed later.

Cases of gas poisoning were numerous on the morning of the 7th: they were treated in the open by means of the "Novita" sets which were extremely satisfactory on account of their light weight and portability. The apparatus was fitted with a two-way

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face piece and inhalation bag, the regulation of the flow of oxygen was so easily controlled that one orderly could attend to several patients simultaneously.

The walking wounded department was manned by N.Z.M.C. personnel. Here, the steady stream of casualties passed at once to the refreshment counters, where food, drink, chocolate, and cigarettes were dispensed, mainly from the stores of the New Zealand Y.M.C.A. Benches were provided where many a grim story was told and the whole battle, as seen or imagined by the narrators, fought all over again with all its hair-breadth escapes. Very loquacious, the walking wounded are in a fine state of exaltation which, duly fortified by good food and minor comfortable attentions, makes them an easily managed and very patient crowd. Passing in turn before the clerks who filled in the necessary entries on the field medical card, and the buff slip, the cheerful queue reached the inoculation tables where A.T.S. was administered—the fact duly noted in the documents; ultimately they reached the dressing room where the whole staff of six medical officers and their nursing orderlies worked simultaneously during rush hours at 12 chairs. The medical officers completed the diagnostic entries on the cards and indicated the nature of a disposal either to C.C.S. or to D.R.S. in the case of the more trivial injuries. From time to time a few of the wounded would be transferred to the M.D.S. if the severity of the case demanded more elaborate surgical treatment and evacuation by stretcher. It is very remarkable how soldiers with severe wounds such as compound fractures of the upper extremity or, rarely, penetrating wounds of the head or abdomen, manage to mingle with the stream of walking wounded and, through battle inebriation, will walk considerable distances, apparently unconcernedly, until exhaustion compels them to become stretcher cases. From the dressing-room the flow of casualties was directed to the evacuation yard where three-ton lorries fitted with seats, and motor omnibuses carried them away at the rate of 180 an hour during the main rush of the 7th.

From 3 a.m. on the 7th June to 12 noon on the 9th, the Westhoff station handled 187 officers, 4822 O.R.; of these: sitting and lying cases, 1767; walking cases, 2879; over 5000 in all, including German wounded prisoners. The lorry service for walking wounded was well maintained, there was no delay, but on about three occasions the stretcher cases awaiting removal accumulated to about 80. From 5 p.m. on the 7th and onwards

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the evacuation by M.A.C. was continuous. During the first sixteen hours the wounded were evacuated at the rate of four per minute.

Special huts were provided for the corps bureau in which 22 clerks worked continuously in shifts. The reports, returns, and states to be furnished were: —

(1) Four hourly signal message to D.D.M.S., giving the numbers of admissions and evacuations of wounded, sick and prisoners of war;

(2) A. and D. books, kept separately for each of the British, Australian and New Zealand Divisions, and other units engaged;

(3) A.F.W., 3185, a daily state, showing sick and wounded admissions and disposals for the use of each of the divisions or other formations.

(4) A.36, as provided for in F.S. Regs.: the nominal roll of casualties admitted showing full designation, unit, corps; the nature of the injury; dates of admission and discharge; and disposal. In other words, an extract from the A. and D. books.

(5) Telegraphic notification of death of officers, to D.M.S.

The correct compilation of the A. and D. book, the basis of all these returns and states, needed special care and some clear-cut method of recording. The method adopted was this:—The buff slip already described and the field medical card were made out for each wounded man admitted; the slip when completed in the dressing room, was placed in the waterproof envelope which contains the field card, and was collected at the time of evacuation by an orderly specially posted by the loading stage. In the case of the walking wounded the buff slip was their ticket of admission to the lorry, without which they could not pass. From the buff slips brought to the office, the A. and D. books were compiled at leisure. The method was almost identical with that adopted at the Somme in 1916; each A.D.M.S. division had his returns sent to him daily whilst the A. and D. books passed to the field ambulance concerned. But the corps bureau system had its imperfections. One of the troubles at Messines was that the bureau was in the same buildings as the corps M.D.S. The extraordinarily busy environment of such a station is not the most suitable for the work of a highly technical clerical staff. Nor is the much harassed commander of such a station in a position to devote his whole energies to organising and supervising the accountancy. The constant inquiries of divisions, units, individuals even, as to the disposal of certain wounded is pre-

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judicial to the smooth working of the mechanism. A corps casualty recording centre, remote from the scene of ambulance activity, was a conception which evolved itself during these days, and was, later, put into operation.

At the corps D.R.S. at Ravelsberg, commanded by Lieut.-Col. Matthew Holmes, there were in all three officers and two tent subdivisions, all of the N.Z.M.C. As the station had been opened for several days, all was in running order by the 7th. Cases came in very rapidly from the night of the 6th, the majority slightly wounded. They were classified on arrival; where it seemed unlikely that the soldier would be fit for duty in three or four days, he was evacuated to C.C.S. A large number were returned to unit after a good meal and a night's sleep; they were collected daily at 9 a.m. under arrangements made by the A.P.M. who took them to the straggler post by motor lorry. It was found that wounds of the lower extremity, however slight, were not suitable for treatment at D.R.S.; as a number of them were infected owing to the presence of small foreign bodies and were not likely to recover under 14 days. "Shell shock" cases were, at first, admitted under the diagnosis "N.Y.D., shell shock." Such of these, as appeared to be true "shell shock" were evacuated to C.C.S., the doubtful were retained for observation. Lieut.-Col. Holmes noted that, considering the arduous nature of the work at the corps M.D.S. the type of case sent down had been well selected. Evacuations to C.C.S. were effectuated by means of horsed ambulance waggons. During the week following the battle the total admissions amounted to 1463, of these: 836 went to C.C.S. while 40 per cent. of the cases were fit for duty in less than seven days.

Colonel Begg, who had so carefully prepared and supervised the corps medical schemes, had every reason to be gratified by the results obtained. "At all points," he says, "the plans worked smoothly and rapidly." He makes special comment on the fact that the original dressing and immobilisation of fractures at the permanent R.A.P.'s was well done and that the surgical and operative work of the C.M.D.S.'s was of a high standard. The train arrangements for removing the lightly wounded had worked admirably: the narrow gauge railways carried 1000 the first day: and his fleet of motor lorries and omnibuses had maintained uninterruptedly their five minute services. He anticipated that the divisional rest stations would be able to restore some 1,500 to 2000 men to duty within a week. Several minor considerations required improving, in his opinion. As both the C.M.D.S. and

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the C.C.S.'s had on one or two occasions become overcrowded increased accommodation at these points were requirements for future consideration. "Though the delay was not serious," he says, "yet, in a rush, it is essential that the stretcher cases be immediately unloaded from the cars of the field ambulances and the M.A.C.'s. The added accommodation could easily be provided at C.M.D.S. by covering large areas with tarpaulins." The return of wounded made by the D.D.M.S. as from noon on the 7th to noon on the 10th shows that the Corps had dealt with a total of 9,735 wounded in all and that the New Zealand Division with 96 officers and 2,798 wounded had the highest casualties.

A correct estimate of the casualties of the New Zealand Division during the capture of Messines is difficult to assess. The number of wounded admitted from the Division, including the 4th Brigade from midnight of the 6/7th to midnight on the 11/12th was: officers, 101; O.R., 2895, a total of 2996 wounded. By adding the killed and missing—most of the later subsequently accounted for—we get a total of 3903. The figures on which this estimate is based are drawn in part from the return of casualties furnished by units to the A.A. and Q.M.G. daily. As the Division was relieved on the night of the 9/10th and battalions were not able to state their casualties in full until the 10th 11th and 12th, during which days they were in rest, it is fair to assume that the casualties reported on these dates represent losses in the Messines operation. If the total of killed, wounded and missing, is accepted to be: 473 killed, 2726 wounded, and 434 missing, as shown in the reports mentioned, the total casualties amount to 3633, equivalent to 15 per cent. of the New Zealand troops engaged. The losses may be said to have been light. The difference between the number of wounded reported by units to A.A. and Q.M.G. and the total given by the A.D.M.S. is 270 wounded. Many, no doubt, reported as missing by their battalions were later accounted for as wounded or killed. The number of killed approximates 700.

Surgeon General Porter, in commenting on the operations of the Second Army, states that the total number of wounded was less than anticipated and that the IInd Anzac casualties were much the heaviest: "The wounds on the whole, were severe," he notes, "mainly caused by H.E.; machine-gun bullet wounds were infrequent, forming only from five per cent. to ten per cent. of the whole. Penetrating wounds of the head and thorax were numerous but compound fracture of the femur was in lower proportions than usual. This is accounted for by the neutralis-

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ation of hostile machine-gun fire by our artillery. The number of cases requiring operation was high." The D.M.S. forwarded to the Corps a very flattering message directed to the medical service by the Army Commander in which he expressed his great appreciation of the most efficient way in which the medical service carried out their arduous work. He was greatly impressed by the rapidity with which the wounded were evacuated, and by the excellent administrative arrangements made and which reflected the greatest credit on all concerned. General Godley, also, expressed his appreciation and thanks for the excellent work that had been done during the recent operations.

Many distinguished visitors—often undistinguished by the busy surgeons working at high pressure—inspected the various stations during the battle. Chief of these was the Army Commander—always distinguished—General Plumer. In a few, homely, unforgetable words he thanked the workers: "You officers of the medical corps," he said at Westhoff, "have not been so fortunate as your comrades in being permitted to assist the wounded in the firing line itself; but you were detailed for duties no less important; which you have performed in a most creditable manner; and, in after years, you also may say with all truth: 'I too, played a part in the Battle of Messines.'"

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A Regimental Medical Officer Dressing Wounded in a Support Trench.

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CHAPTER XIV.

After Messines.

After a brief period of rest the New Zealand Division came back to the line on the 12th of June taking over the trenches south of the Douve, previously held by the 3rd Australian Division. North of the Douve the 4th Australians were replaced by the 25th Division. Divisional headquarters again established its offices in Steenwerck. The enemy was cautiously withdrawing to a prepared position about a mile and a quarter in rear of his outposts; it was the Corps intention to keep close touch with this local withdrawal and to seize any outlying strong points still held in the slowly crumbling defences. The medical dispositions included the taking over of the A.D.S. at Charing Cross by the No. 2 New Zealand Field Ambulance and the opening of an M.D.S. at Nieppe by the 3rd New Zealand Field Ambulance while the 1st Field Ambulance remained at Ravelsberg. The 4th New Zealand Brigade and its ambulance passed to the command of the New Zealand Division; no changes were made on the sector held by the 4th Brigade.

A limited advance under barrage was carried out on the whole Second Army front on the 14th commencing at 7.30 p.m. In all about 145 wounded were brought in, all R.A.P.'s being reported clear by 9 a.m. on the 15th. The trench tramways through the wood and beyond were extensively used in these evacuations. A readjustment of medical positions followed this operation. No. 2 and No. 3 Field Ambulances established headquarters at the C.M.D.S. at Pont D'Achelles with Charing Cross and Underhill Farm as A.D.S.'s and the 4th Field Ambulance, shelled out of Pont de Nieppe, withdrew its M.D.S. to Nieppe with advanced dressing station at the Brewery.

During the second half of June the Division maintained an aggressive policy, treading heavily on the heels of the retiring Bavarians who were grudgingly giving up minor strong points in their forward defences. There was much artillery activity on both sides, our trench areas were subject to very heavy bombardments, and the back areas, including Baillieul, were receiving an increased

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volume of enemy fire. Even about the A.D.S. at Charing Cross, on account of the close proximity of our batteries, there was severe shelling at times, making the work of this post a very trying service. Our daily losses in consequence, were much above the average. During the period from the 15th to the 30th of June our casualties were reported to be: 106 killed; 801 wounded; 27 missing. There was an increasing casualty list due to gas poisoning and there were clear signs of nervous exhaustion in many of the sick admitted to D.R.S. Of 414 soldiers admitted to Ravelsberg, by sickness, no less than 151 were diagnosed exhaustion; 32 neurasthenia; and 62 N.Y.D.N., the new army designation for "shell shock" which demands some explanation.

About this time medical opinion had undergone important modification in regard to the nomenclature and early diagnosis of those nervous diseases which we now know as the psychoneuroses of war. According to Lieut.-Col. Aldren Turner (B.M.J. June 10th, 1916), soldiers suffering from nervous and mental shock began to arrive in England as early as September, 1914. The cases were stated to be of three types: (1) those suffering from the effects of shell concussion; (2) men suffering from neurasthenia; (3) cases exhibiting one or other of the severe psychoses.

Early in 1915, Sir Alfred Keogh, acting on the reports of specialists, arranged that all this category of casualties should be sorted out by neurologists and pshychiatrists at base hospitals in France. Amongst the specialists, were Lieut.-Col. Aldren Turner, Physician to the National Hospital for Paralysed and Epileptics, and Lieut.-Col. Chas. Myers, Psychologist of Cambridge University. As early as February, 1915, Lieut.-Col Myers who was working at the Duchess of Westminster's Hospital at Le Touquet, described in the Lancet (February, 1915) under the heading "Shell-Shock," certain nervous conditions in soldiers associated with loss of special senses, e.g., deaf-mutism, and narrowing of visual fields, indistinguishable from hysteria. Whereas Lieut.-Col. Aldren Turner, in detailing his three months experiences at a Base Hospital, (B.M.J., May, 1915) differentiates those suffering from shell concussion from others showing extreme neurasthenic states. Neurological centres had been established in most of the large military hospitals in England for the treatment of similar cases. Of the neurological divisions, that of No. 4 London General Hospital, known as the Maudsley Hospital, became very prominent; it was commanded by Lieut.-Col. Mott, R.A.M.C., the distinguished pathologist of the London County

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Council Asylums' Board. The three Lettsonian lectures on the "Effects of high explosives on the central nervous system," delivered in February, 1916, before the Royal Society of Medicine by Mott, in which the lecturer demonstrated hystological changes in the brain and spinal cord in fatal cases, did much to influence army practice in nomenclature and disposal during 1916. There was, as is evidenced by the definition of shell shock given by Colonel Begg during the Somme operations, a strong bias in favour of an organic traumatic condition as the chief if not the only cause of shell shock. But, in 1917, these views were materially changed. Both French and German neurologists had attacked the problem from different angles, but in the main united in discrediting the organic traumatic basis of shell shock and in emphasising the fact that the true condition was a functional nervous disorder, hysteria, "pithiatism," arising in a premorbid personality and in every way similar to like conditions of traumatic neurasthenia, or hysteria, already recognised in civilian practice. But there was a wide divergence in methods of treatment and much confusion in nomenclature. A list of the various modes of therapy, then in vogue, reads like a page from Rabelais. There was treatment by cerebro-spinal galvanism; treatment by disciplinary measures; by "Torpillage": painstaking, indefatigable, masterful, relentless pertinacity on the part of the operator, fortified by a powerful sinsusoidal current—a treatment condemned by the Germans as "inhuman." There was treatment by suggestion, in hypnosis, or during light ether anesthesia. Treatment by massage and Faradism; by the administration of leicethin; treatment by lumbar puncture; treatment by psycho-analysis.

In March, 1917, Major Carmalt Jones, R.A.M.C., now Professor of Medicine at Dunedin University, read a paper at a meeting of the Second Army Medical Society at Remy Siding which was attended by officers of the N.Z.M.C. and of which the notes have been preserved by one of them. The notes succinctly outline the opinions then held by neurologists attached to the Second Army, in as much as "shell-shock" is stated to be caused by an explosion in the immediate vicinity of the patient "sufficient to knock him down." The lecturer went on to show that external or recognisable lesions were rarely demonstrable and that lesions of the nervous system probably minute, microscopic, led to exhaustion states or functional disease. Tremor, insomnia and sensory-motor changes were the symptoms most frequently met with, paresis or tics were not so common; the worst cases

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were seen in the younger soldiers, there appeared to be a high immunity after the age of 32. The treatment advised was by encouragement and persuasion coupled with physical and workshop training. As a rule some 60 per cent were dischargable to duty. Admittedly an optimistic estimate as compared with the 40 per cent. given by contemporary German writers. We may conclude then, that the central idea of physical trauma still dominated the army concept of shell-shock. And, at Messines, cases were labelled as N.Y.D. "Shell-shock." Under the influence of the psychiatrists and psychologists changes in army opinion were taking place, and there was a growing body of opinion, both French and English, that the terminology was bad as many cases classed as shell-shock would have been better described as concussion neurasthenia, psychasthenia, hysteria or neurasthenia. That there was much confusion owing to the rapid change in the patient's condition from front to base, was evident. The fact that those wounded by high explosive were immune from shell-shock, led many to believe that the condition—whatever it was—was not related to explosion concussion in any way but that fear with gradual psychic exhaustion acting on a neuropathic individual was the predisposing cause, whereas any circumstances, quite apart from shell explosion, might determine the onset of the disorder.

Two very important monographs issued in the "Horizon" Series under the auspices of the French Service de Santé did much to remodel current views and emphasised the great importance of scrupulously avoiding any diagnostic "suggestions" inherent in the terms "commotioné" or "shell-shock." The attitude of Roussy and L'Hermite was somewhat opposed to that of Babinski; the former based their opinions on the observation of cases seen close to the firing line, the latter was strongly impressed by experiences gained at the base hospitals at a longer interval from the original "shock," "commotio," "traumatism," or "suggestion." But the divergencies of opinion in the French workers although very acute and causing many ripples in English neurological circles, were in the main unimportant to the front line surgeons, who chiefly desired to be relieved of the onus of making any expert diagnosis in these ambiguous conundrums. G.R.O., dated June 17th, 1917, introduced a new method of classification and disposal of soldiers who, "without any visible wound became non-effective from the effects of British or enemy weapons in action." The R.M.O. or the ambulance officer was not to record any diagnosis. He was to

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enter on the field medical card the letters N.Y.D.N. (not yet diagnosed, non-efficient), and to note any known facts as to the true origin of the condition. The term "shell-shock" was on no account to be used. The responsibility for further medical examination was to rest with the A.D.M.S. concerned. If it seemed clear that the case was of such a nature as to require treatment for more than a week, transfer to a special C.C.S. was indicated; but if the soldier could be returned to duty after rest and attention in the D.R.S. the diagnosis was to be altered to some such term as "exhaustion." In July the D.M.S. Second Army directed that all cases of N.Y.D.N. should be sent to a special receiving centre, a C.C.S. where final agreement as to hospital treatment was to be decided.

The month of June ended in very hot oppressive weather with frequent thunderstorms. The enemy artillery was exceptionally active, much gas was used especially against Ploegsteert Wood; night bombing aeroplanes and long range guns raked our back areas at intervals; our balloons were frequently shelled or attacked by fighting aeroplanes. On the 28th, the Nieppe balloon which had been shelled unsuccessfully for nearly 3 hours was at last brought down in flames by a flash of lightning during a violent thunderstorm, which ended the day. A cynical Frenchman who witnessed the event from Nieppe said to one of our medical officers, "vous voyez qu'ils ont raison les Boches—le Bon Dieu est avec eux—Gott Mit uns!" A welcome relief of the Division came at the end of the month, leave reopened on the 1st of July. The medical posts were taken over by the ambulances of the 4th Australian Division. Our headquarters retired to Vieux Berguin, about five miles south west of Baillieul where the tired troops were billetted in pleasant country places. The 4th Brigade Group remained under the command of the 4th Australian Division and did not leave its sector just north of the Lys.

Early in July the 3rd (N.Z.R.) Brigade and the Pioneer Battalion attended by one section of No. 3 New Zealand Field Ambulance went north to assist General Anthoine's Second French Army in digging gun positions. Many untoward delays had hampered the launching of the British coastwise offensive. Even now there was much to be done, especially in the Northern sector. The Germans wondered why we did not come on; and in the middle of July, made a stroke against the 4th Army at Lombartzyde, whereby a bridge head was lost to us. In this operation an unexpected gas shell attack caused very serious casualties because of our unpreparedness for a new and very

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potent type of volatilised oil, called later "mustard" gas, with which the New Zealanders were to make acquaintance very shortly.

All the plans for the British Flanders Campaign were now complete: on a fifteen mile front the Second French Army, the Fifth and the Second British Armies were to attack from the Lys northwards to Steenstrate; the main thrust was to come from the Fifth Army on a front of seven and a half miles in the north of the Ypres salient; General Anthoine was to advance step by step northward of this; and to the south, our Second Army was to strike between Hollebeke and Warneton, feinting a flanking movement to the north of Lille. The IInd Anzac Corps on the right of the Second Army with the New Zealand Division on its right was to push in a south-easterly direction towards Warneton so as to make the enemy believe that a crossing of the Lys was intended. The special work of our division was to take La Basse Ville, a cluster of factories and a sugar refinery, about three-quarters of a mile south-east of Warneton on the main road from Armentières.

By the 19th of July, the New Zealand Brigades, well rested and in good fettle, were coming back to their old position in front of Ploegsteert Wood. The medical arrangements of the A.D.M.S., Colonel McGavin, D.S.O., were not markedly modified from previous dispositions. A special fortified R.A.P. was constructed in the captured German trenches about the centre of our Northern sector near the site of the cabaret "Au Chasseur," which at one time stood on the Messines-La Basse Ville road and about 1000 yards north of the last named village. The R.A.P. was called "Ultimo" from a trench name given by us to a German avenue connecting their front and supporting lines and in which the R.A.P. was situated. The avenue had been restored by us and was operable by stretcher parties. Ambulance bearers taking over wounded at "Ultimo" could carry down the avenue about one mile to the bearer relay post at Dead Horse Corner at the northern angle of the wood, which connected with the Charing Cross A.D.S. by trench tramways. The M.D.S. at Pont D'Achelles, similar in all respects to that of Westhoff, provided ample accommodation and was in telephonic communication with divisional headquarters. The A.D.S. at Underhill Farm was at present little used except for local casualties. The dispositions of the 4th Field Ambulance were not altered, their M.D.S. at Nieppe in the Communal School provided accommodation for 60 stretcher cases. The car post at Motor Car Corner was still held serving Surrey

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Farm R.A.P. about half a mile away. At the Brewery, in spite of damages to motor ambulance cars and occasional casualties to M.T.A.S.C., a large car was always on duty. The Brewery, although much exposed to observation and frequently participating in the "hate" intended for all too proximate batteries, was a convenient A.D.S. which it was usually possible to evacuate both by day and by night. With the exception of the two R.A.P.'s on the 4th Brigade front and Ultimo all the other R.A.P.Ss were situated a considerable distance from the front line, which was, possibly, a disadvantage in the forthcoming operations. By this time all R.A.P.'s were provided with Thomas' hip splints and a much more extensive use of the Dayfield Body shields had been recommended for regimental stretcher bearers whose losses had generally been very severe in previous actions.

The allocation of medical units was as follows:—No. 1 Field Ambulance, at the D.R.S. at L'Estrade near Steenwerck which had been occupied by us in early 1916. The 2nd and 3rd Field Ambulances divided between the M.D.S. Pont D'Achelles and the A.D.S.'s at Charing Cross and Underhill Farm, supplying all R.A.P.'s with field ambulance bearers. The Dental Hospital was at de Seule not far from the Reinforcement Camp; the usual allotment of dental sections: 1 per field ambulance was adhered to. The New Zealand Dental Sections had been remodelled and had now reached their perfected organisation. The Dental Section which had been formed in the United Kingdom to accompany the 4th Field Ambulance was a very mobile unit, all cumbersome equipment had been eliminated, with the result that two small panniers, one pack-mule load, now contained sufficient instruments and material for all operations, surgical or prosthetic, The actual space taken up in transport was only half of a half limbered G.S. cart. The Dental Hospital had also been made mobile by allotting one three-ton lorry to the purpose of its transport as required. There was no difficulty in maintaining a constant supply of expendable material as, in accordance with a contract made between the New Zealand Government and the War Office, all necessary dental equipment could be obtained from Advanced Supply Depots of medical stores. In this way all difficulties had been overcome by experience in the field and the New Zealand Dental Corps may justly claim to be the pioneers of a movement which resulted in an efficient and practical dental service for the front line troops.

At 2 a.m. on the 27th, the first attack on La Basse Ville was made, a company of 2nd Wellington entered and held the village

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capturing prisoners at the Moulin Carlin, the sugar refinery at the southern end, and at the Tissage at the northern end nearest to Warneton. The company withdrew before 5 a.m. leaving posts to hold the position, but shortly after that hour our posts were overwhelmed by a company of the 16th Bavarian Division who retook the village. Our casualties were 4 killed, 25 wounded, 9 missing. The wounded admitted to M.D.S. up to 1.30 p.m. were 40, and 13 gassed.

On the night of the 28th Armentières was subjected to an extraordinarily heavy bombardment with the new "Yellow Cross" gas. Shells seemed to rain into the town for many hours. A very large number of civilians were gassed in their cellars: of these unfortunates the New Zealand Stationary Hospital admitted a convoy of over 100 men, women and children. Armentières was cleared of its remaining civilians and became a city of the dead.

The final attack on La Basse Ville was timed for 3.50 a.m. on the 1st, and was to coincide with the opening of the great Flanders Campaign of 1917, whose first objectives were the ridges about Ypres as far out as Passchendaele. The task of retaking the lost village was given to the 1st New Zealand Brigade. Under the cover of a well planned and skilfully executed barrage, 1st Auckand and 2nd Wellington advanced to the attack on the extreme right of a 15 mile battle front. Two companys of 2nd Wellington penetrated the ruins, cleared the cellars and in a stiff fight lasting 50 minutes completed the capture of the village, killing most of the garrison. All the New Zealand objectives were reported by our contact planes to be secure by 5.40 a.m. and a local attack easily beaten off by rifle and machine gun fire. By 6 a.m. the wounded, mostly by passing through "Ultimo," had reached Charing Cross A.D.S. and at noon, the the tally of our wounded cleared by M.D.S. was, 29 lying and 54 sitting. The German counter attack took place in the afternoon and was accompanied by extremely heavy shelling which gave us more casualties; but, the enemy parties were easily held off by our barrages and infantry fire, although they advanced with much determination. At 5 p.m. there was a downpour of rain which continued all night. About 6 p.m. the wounded were coming in freely, carrying parties organised from Bavarian prisoners assisting. The total at this time was 149, of which 58 lying and 91 sitting. During the night the wounded continued to come down in an unbroken stream; by midnight, the total treated at Pont D'Achelles was 7 officers, 171 O.R. and 9 wounded prisoners. Information obtained from the prisoners showed that

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La Basse Ville had been held by one company of the 29th Bavarian Regiment; there was a garrison of over 40 at the Sugar Refinery, all of whom were presumably killed in the cellars. At the north west corner of the village in a cellar under the Tissage was a forward R.A.P. The battalion medical officer was not there—he lived further back at battalion headquarters—but a Bavarian Medical N.C.O. and some stretcher bearers had an aid post there. The regimental dressing station was in fortified cellars at Warneton and was cleared by motor ambulances to a Feld Lazaret six miles away at Bousbecque near Commines. The Bavarian medical orderly was attending to two wounded men in the cellar when our stormers arrived, several Bavarian soldiers rushed into the aid post but a New Zealander threw two bombs in at the doorway; the men inside took cover behind some boxes, the bombs did no damage. Later, one of the soldiers crept up the steps to reconnoitre, but was promptly bayoneted; the remainder wisely determined to stay below and were ultimately taken prisoner. From the prisoners we also had news of some of the missing of the 27th. One of these, seriously wounded, was carried back to the regimental dressing station at Warneton and from thence went by car to Bousbecque where in the field hospital he had his leg amputated and remained for some six days receiving all necessary attention and good treatment.

The casualties reported to the A.A. and Q.M.G. by units of the division for the two operations at La Basse Ville were: killed, 111; wounded, 312; missing, 21; total 444. The 1st Brigade had 61 killed, 183 wounded, 5 missing. The arrangements for the evacuation of wounded worked smoothly, there was no delay at any point. Captain Goldstein, M.C., R.M.O. to 2nd Wellington had his hands full at "Ultimo", but all his wounded were safely in when he was relieved.

The first casualties caused by the new "Yellow Cross" gas were observed on the New Zealand front during the later part of July. Shells containing the so called "mustard" gas were first used in the Ypres salient on the 12th of July 1917; some 2000 casualties resulted. Ignorance as to the nature of the gas and its effects was the cause of the initial losses which were heavy: the incidence of serious cases amounting to over 12 per cent. during the July bombardments, the mortality stated to be in excess of four per cent. On the 31st July some 20 gassed cases were admitted to No. 3 New Zealand Field Ambulance. They complained chiefly of smarting of the eyes and occasionally

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blistering of the skin where the gas had made contact. The eyelids, in severe cases, were swollen and œdematous, the conjunctiva markedly inflamed. Chemosis was frequently present; all had severe irritation and photophobia. A case admitted to No. 4 Field Ambulance gave the following history: he was a company cook, during the night a gas shell entered his kitchen; in the morning be picked up a fragment of the shell and put it in his trousers pocket as a "souvenir" of the event; some hours later, on his admission to the ambulance, he was found to be suffering from a severe burn of the groin, for which he had to be treated for several days. He had no other symptoms. Warnings had been issued to the division a week previously as to the nature of the new gas and its symptoms. After the bombardment at Ypres two blind shells had been collected and sent to the central laboratory for examination. They were painted blue with a yellow head and were marked near the shoulder with a yellow maltese cross. The so called "mustard" oil, di-chlor-ethyl sulphide, a heavy liquid with a boiling point above that of water, was enclosed within the shell case and atomised at the moment of contact by a small charge of high explosive. The liquid, being heavy, clung to the ground giving off vapour slowly and for some considerable time; even the small quantities which remained in shell holes and on fragments of the shells caused blistering if handled. The gas being very heavy filtered into dugouts and permeated the air for much longer periods than any other gas used. Although weak concentrations caused no immediate discomfort, yet prolonged contact produced in time serious disabling conditions. The absence of visible gas and the comparatively inoffensive odour prevented early recognition. The late onset of symptoms permitted the inhalation of the gas for long periods without noticeable effects at first; the severe respiratory complications were often delayed for from 36 to 48 hours. All these conditions combined to make "mustard" gas the most effective poisonous substance employed by the Germans in producing material casualties. Information was promptly circularised to all medical officers by the Army authorities whose experiences were now based on the investigation of bombardments in the Fifth Army area. The hypodermic injection of calcium chloride 10 per cent. was reported by Colonel Herringham to be effective in reducing the swelling of the conjunctiva and eyelids and a spray of menthol in oil for the protection of the throat and larynx was suggested. The tracheitis followed by bronchitis coming on about the second or third day soon led to pneumonia,

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frequently with fatal results. Special instructions were issued as to the disposal of cases. The clothes of those exposed to the oil were to be removed and the whole body sponged with sodium bicarbonate solution, with which the eyes and naso-pharynx were also to be treated. The alkaline solution had a markedly sedative and neutralising effect on the gas burns and relieved irritation.

Exceptional weather conditions prevailed during the month of August. Heavy rains, cold winds and thunderstorms marked an unusual season; the low-lying forefield south of the Douve became a swamp, the trenches filled with water. All the hardships of the muddy battlefields of the Somme were reproduced, even trench foot broke out amongst the drenched trench workers. Winter precautions, including the use of rubber boots, became a necessity and solidified alcohol for fuel, and pea soup tablets were isued for use by the outposts. Everywhere there was a considerable weight of enemy bombardment, most severely felt in the front positions and attended by heavy casualties. During the first 14 days of this wretched month we had 211 killed, 941 wounded and 10 missing. Sickness claimed 1130 casualties. The divisional sick wastage rate crept up to over 10 per 1000 per week. If we add to the battle casualties our losses from disease this fortnight claims no less than 2292 soldiers lost to the division, a wastage equivalent to 20 per cent. per month, or about double that recorded for the whole of the first year in France, which did not exceed 10 per cent. per month for infantry, 5.4 per cent. pioneers, engineers or artillery and 2 per cent for medical troops. The Anzac Corps was holding the flank of the salient and was taking the heaviest fire which the enemy could concentrate on what seemed to them the most dangerous point in their defences. Amongst other evidences of their activity our baths at Pont de Nieppe were rendered useless by heavy shells. The neighbourhood of the A.D.S. at Charing Cross was feverishly searched by 21 cm. howitzers. Baillieul was shelled by day and had its share of the night bombing raids which killed many of our horses in artillery and field ambulance lines. Even Hazebrouck was subject to occasional bombardment by a naval gun firing at the phenomenal range of over 20 miles. This necessitated the hurried evacuation of the New Zealand Stationary Hospital, a step decided upon by the D.M.S. All patients were removed to hospitals in the St. Omer area. By the 10th most of the staff with the exception of 5 officers and 60 O.R. was detached for service with other medical units of the Second Army. The work of dismantling the hospital was proceeded with, all equipment was packed and ready for transport by the 14th. A new site at Wisques, near St. Omer was

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chosen for the hospital towards the end of the month, and by the first of September work had commenced in the new quarters. The New Zealand Stationary Hospital was now to become the N.Y.D.N. centre for the Second Army.

The last week in August saw a welcome relief for the division. On the 23rd the 4th Australian Division was taking over a part of our line and on the 27th the relief was completed by the 8th Division. The sorely tried troops marched to various entraining points about Baillieul, ultimately detraining in the Lumbres area, where pleasant billets in a beautiful fertile country provided a sheltered retreat for well earned rest.

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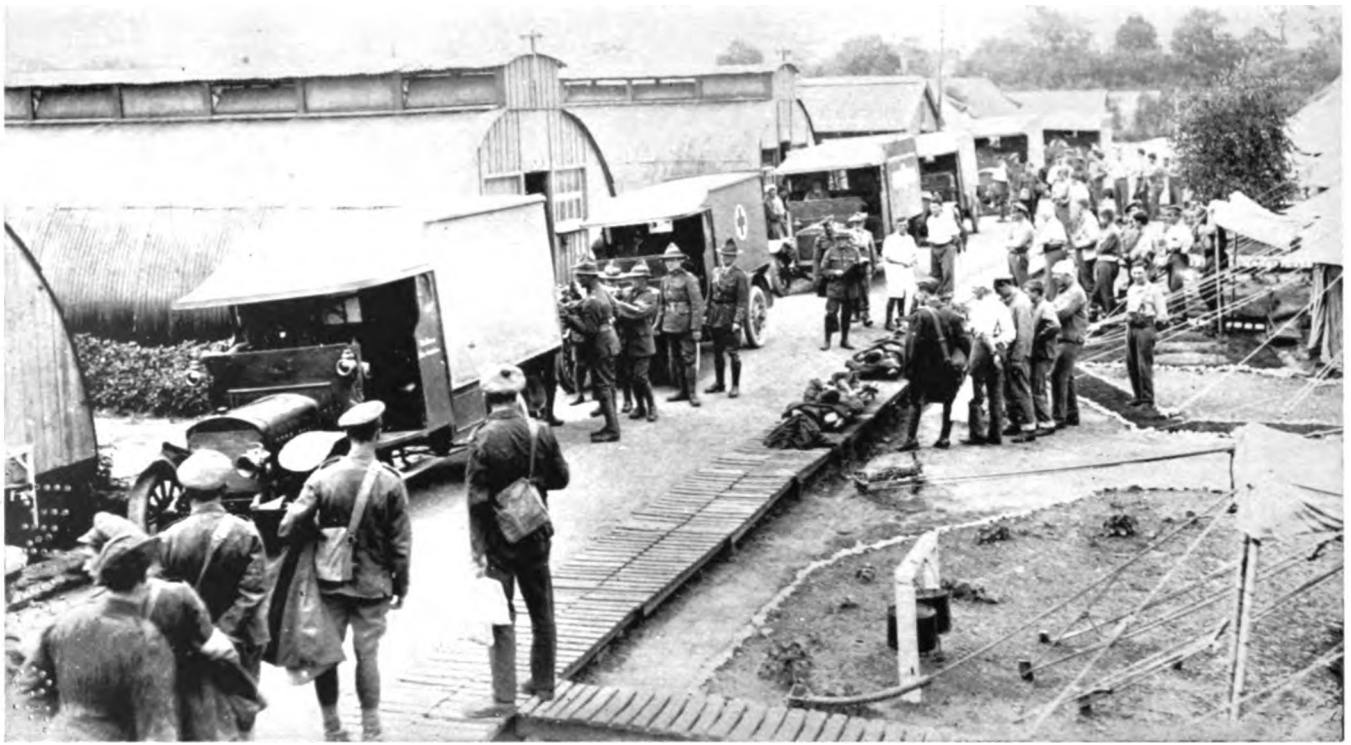

THE NEW ZEALAND STATIONARY HOSPITAL AT WISQUES, 1917.

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CHAPTER XV.

Passchendaele.

While the Division rested and trained the battles in the Ypres salient were reaching an impasse from which not even the best troops of the British Armies could break through. In the northern sector, along the road that led from Ypres to Gravenstaffel and the heights above Passchendaele progress was despairingly slow. Tempestuous weather and the surprising toughness of the defences combined to stay the Fifth Army in a morass beset by steel and concrete fortresses that, like the tombs on the Appian way, flanked the road to Gravenstafel. In the operations of the 16th of August the Fifth Army—although successful everywhere else—failed to make headway in the St. Julien sector; their advance had been so delayed that a German counter attack drove back the thinned waves of assault to their original positions. Wet weather followed for the rest of the month. The Second Army was now brought up and set at this unforgiving sector north of the Menin Road and on the 20th September another great battle was fought. The Australians of Ist Anzac broke into Polygon Wood and, with the other Corps to the south of them, took all the high ground on the Menin Road, once held by us in October, 1914, now regained after two months piecemeal fighting. But in the St. Julien sector the ground was low lying, wet and sodden, studded with pill-boxes, and to be conquered only yard by yard with heavy losses. The 25th and 26th of September saw further minor progress: the Australians cleared Polygon Wood completely and took Zonnebeke village, and to the north, London and North Midland Territorials made good a long chain of pill boxes, carrying our line to Kansas Cross at the foot of Abraham's heights just two miles from the original point of departure; objectives gained at so great a cost which should have been attained early in August. No hopes of a break through now remained; it was to be a scramble for winter positions.

The French armies, nursed back to better humour by Pétain's cautious leading, had, during this month of September, taken their final revenge at Verdun and by a carefully planned and well

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executed campaign, based on limited objectives, had finally restored the perimeter of the fortress to its original trace, so wiping out all the gains made by Germany in nineteen months of brutal assaults. Further plans were in hand for an impending attack on the Moronvilliers Massif and the Chemin des Dames.

The Italian offensive across the Isonzo was now at an end; it had been successful but unfruitful; Gorizia still barred the way to Trieste and the morale of the Italian people and of part of its army had been shaken by ultra socialistic propaganda. Riots in Turin, mutinies in the Army were signals of impending misfortune. Already German and Austrian Divisions were concentrating against Cadorna's flank and were destined to wipe out all his successes of two years laborious fighting. By the triumph of the Soviet parties, the Russian front had finally collapsed; the rolling up of Rumania was now inevitable. And yet, everywhere there was talk of Peace. While Ludendorf was training new armies in the obscurity of the Russian front, and grimly encouraging his Western Armies, reeling from a multiplicity of blows he dreamed of peace in 1918 through a crushing German victory.

On the 14th of September, Sir Douglas Haig reviewed the New Zealand Division near Harlettes on the road to Boulogne; and ten days later a warning order was issued, somewhat sooner than anticipated, for IInd Anzac to relieve the Vth Corps in the St. Julien sector. During the following days our brigades were on the march; on the 27th Colonel Begg took over from the D.D.M.S. of the Vth Corps; the New Zealand Divisional Headquarters moved to Watou near Poperinghe; and the 49th and 66th Divisions joined the IInd Anzac Corps. By the end of the month battalions of the 2nd Brigade, relieving the 49th Division had taken over the positions taken on the 26th astride the road to Gravenstafel, just in front of Kansas Cross. The weather was fine, the days warm, the nights cold. There was a brilliant moon of which the enemy aircraft took advantage to bomb most unmercifully our back areas and our communications.

The area taken over by IInd Anzac was a rectangular strip about 17 miles in length from east to west and had an average width of about one mile. Forward of Poperinghe the area was served by one road only, the main road to Ypres. All the traffic of IInd Anzac, most of that of the XVIIIth Corps and part of that of Ist Anzac, converged at Poperinghe where there was at all times a dense, slowly moving surge of packed transport, and along the main road to Ypres the traffic flowed on both sides of

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the road in opposing streams as turgid as any seen during work hours in the crowded streets of London; only at Ypres did this densely packed flow divagate to avoiding roads, made necessary by the constant shelling of Ypres the focus of transport streams—the hub of the salient. The deserted road ran eastward through the "City of Fear," past the hideous midden that once was the Cloth Hall—the glory of Flanders, which cost a hundred years of Flemish craft to build—and which had all been defaced, razed and crushed down to ruin in a few months by the craft and industry of German munition workers. The giant howitzers, products of the skill and scientific wizardry of the twentieth century craftsmen, had with jealous fury torn down and ground to powder all that the thirtienth century builders could make that was most lovely, lasting and imperishable. Out through the Menin Gate, and turning northwards, skirting the ramparts of Vauban, a side road led on past broken villas, through the ruins of St. Jean, to Wieltje and to the historic ground now held by the New Zealanders. At Wieltje the road forked: the north branch, the main road, led on to St. Julien and Poelecappelle—lost to the French in March, 1915—the eastern route to Gravenstafel and to the Bellevue Spur north of Passchendaele. It was at Wieltje, in an estaminet just at the fork of the road, that the Canadians had their A.D.S. during the second Battle of Ypres in 1915. Their front line lay on the eastern slopes of Gravenstafel, named by them the heights of Abraham; British troops held the Broodseinde cross-roads on their right. But all these positions were lost during the cloud gas attack and for two years or more Wieltje had remained a forward point in a small salient in our front line system. During the advance of the 20th of September, 1917, Wieltje again was used as an A.D.S. and the medical arrangements now being made for the New Zealand Division were curiously similar to those of the Canadians in 1915, whose lost lines in front of Gravenstafel the New Zealanders were about to retake.

Operations at Gravenstafel 4/6th October, 1917.

The Second Army and the Fifth Army were to renew the attack on the 4th of October. IInd Anzac Corps on the left of the Second Army would fight on a two divisional front. New Zealanders to the north to take Abraham's heights, the 3rd Australian Division on their right. In front was the 4th Bavarian Division whose dispositions were known to us from accounts given by prisoners. The task of our division was to be accomplished by the 1st and the 4th Brigades. Each brigade would attack

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on a two battalion front; the rear battalions to leap frog through to the final objectives. The divisional front was 2000 yards in width, the depth of the attacking brigades 1200. The field guns of five divisions would provide the creeping barrage and the Corps and Army heavy artillery were already pounding the strong points into submission. A limited advance with unlimited explosives to blast out a way. If the weather held it must succeed.

Colonel McGavin's medical arrangements for the evacuation of wounded hinged upon the A.D.S. at Wieltje and the bearer relay posts in front of it. The post at Wieltje taken over by Lt.-Col. Murray, D.S.O., and the No. 2 Field Ambulance was in a mine gallery some 100 yards long which terminated in a large excavated chamber. Two openings led out on to the road, down one of these, on an inclined plane, stretchers could be lowered by ropes and, by the other, exit from the dressing room was gained to the roadway above, where motor ambulance cars received their loads. There was accommodation for a large number of wounded, and the dressing station was secure against any shells the enemy were likely to use at this point. The main bearer relay post forward of the A.D.S., on the Gravenstafel road, and about a mile distant, was in a collection of concrete dugouts and sandbagged shelters known as "Bridge House," or "Midland Farm," on the line of the trench tramway that skirted the road. One medical officer and 12 stretcher bearers formed the garrison of this post, which had the usual reserves of medical supplies, comforts, stretchers, blankets and water. Half a mile further on, and near the junction with a road running north to St. Julien, was a cluster of relay posts in concrete dugouts of which the chief, to the south of the road, was known as "Spree Farm;" all were situated in what had been the British front line during August and early September, when our advance was delayed by wet weather, and it was from this line that the third attack was made on September the 20th. The garrison of each of the relay posts was 12 bearers. The most advanced bearer relays were at the R.A.P.'s; on the left "Gaschyler Galleries," on the right "Delve" Farm. From Delve Farm, distant some two miles from Wieltje, there was a chain of relay posts some 400 yards apart linking up with Bridge House. At the Gaschyler Farm Galleries R.A.P., about 1000 yards north-east of "Spree Farm," there was ample accommodation in deep dugouts for the R.M.O.'s of the left brigade, and 26 N.Z.M.C. personnel besides the regimental stretcher bearers. The northern infantry track, a trench grid pathway, led up to this R.A.P. whose route of evacuation was on

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the "duckwalk" to "Spree Farm," thence by road via Bridge House to Wieltje A.D.S. The southern R.A.P. at Delve Farm was similarly staffed and a parallel duckwalk led south of the road to the tramway terminus at Bridge House. It will be gathered that both the road surface and the surrounding crater area were not practicable even for foot traffic. The shell holes were contiguous in places and often of great depth. Dead and the litter of a two months' battle lay everywhere in hideous confusion. The torn ground was strewn with arms, equipment, unexploded shells, and material of all kinds; it was a repelling wilderness of desolation, even in dry weather most difficult to traverse, thorny with tangled skeins of barbed wire and in wet weather wholly impassable except on the narrow boarded infantry tracks. Walking wounded were provided for by a divisional collecting station some half a mile down the road to Ypres from Wieltje. Here, they could entrain on the light railway or in the absence of a train service, motor lorries or omnibuses would be in waiting. Hot food and drinks were provided for by a stall close to the entraining point, manned by the Y.M.C.A.

In the northern suburb of Ypres there is a harbour at the terminus of the Yser Canal which was at one time flanked by tall warehouses. The locality was known as Kaaje (quay), a mildly busy place in pre war days when the sea borne trade came and went by Dixmude, but now horribly mangled and ravaged by three years of siege. This was the only outlet for the northern portion of the salient, all traffic converged here to a bridge across the Ypres-Commines Canal not far from the harbour. The returning track having passed the bridge led to a bend known as the Devil's Corner where tradition had it that it never ceased shelling, and a little further on the road turning westward towards Poperinghe, passed a corner where there was safety and which was known as Salvation Corner. The painstaking regularity of the bombardment of Kaaje resulted in the wrecking of every house in the neighbourhood; there was none left intact in 1915, few standing in 1917—a melancholy spot known to the present generation as "Dead End." A road started eastward from the harbour, leading to Poelecappelle passing through St. Jean and Wieltje, the latter only a mile and three quarters from the Yser embankment. At Dead End the reserves of the N.Z.M.C. were concentrated—reserves of bearers, stretchers, blankets, and medical supplies, mostly in dugouts in the canal embankments.

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Halfway to Poperinghe was the village of Vlamertinghe, in 1914 a romantic Flemish townlet with high gabled roofs, an ancient moated farm and a mighty windmill built of solid brickwork jacketed in white plaster, flanking the shady roadway like a Norman fortress. It had abandoned its sails and taken to steam in competition with the more modern flour mills further down the road at Brandhoeck. Our divisional sick collecting post was in the moated farm, the corps walking wounded collecting station in the Vlamertinghe mill.

In the corps medical arrangements made by Colonel Begg, certain modifications, in the general principles of evacuations need a moment's consideration. At Messines we have seen that the evacuation of the wounded from A.D.S. was carried out by the division by means of its own cars. The Anzac medical arrangements for the battle of Gravenstafel included the pooling of all ambulance transport and the clearing of the A.D.S.'s by M.A.C. under corps control. Possibly, this was done in order to avoid waste of transport; possibly, for traffic control. All A.D.S.'s were now to be cleared under corps arrangements through corps M.D.S. and corps walking wounded station to the C.C.S.'s. A corps gas treatment centre was provided and a large corps rest station. No special corps bureau for recording casualties was devised, although Ist Anzac had already established the practice; all returns were still to be furnished by C.M.D.S. and C.W.W.C.P. as at Messines, although matters had been improved by segregating walking from lying wounded in separate units.

The final medical arrangements were completed on October the 1st. No. 2 New Zealand Field Ambulance, Lt.-Col. Murray, D.S.O., commanding, was in charge of forward evacuations with headquarters at Wieltje mine shaft. All bearers of the three Field Ambulances were at his disposal. A reserve of 70 bearers had been formed at Dead End; there was a total of 217 bearers available for forward work. It is to be noted that No. 3 Field Ambulance was with its brigade, as yet in corps reserve. At each of the three R.A.P.'s there were 24 bearers N.Z.M.C. and two runners. 30 bearers under Major McCormack, N.Z.M.C., at Midland Farm; with 24 bearers in each of the relay posts. No. 1 Field Ambulance under Major Craig, N.Z.M.C.—temporarily in command, replacing Lt.-Col. Mathew Holmes, evacuated sick—had manned the moated farm with their tent subdivisons; and at Vlarnertinghe Mill, the corps walking wounded collecting post was in charge of No. 4 New Zealand Field Ambulance, Lt.-Col. McLean commanding. The final instructions issued by Col. Begg were: That the Thomas'

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splint was to be applied at all R.A.P.'s to all fractures of the lower limb or wounds of marked severity; that as little redressing of wounds as possible was to be practised so as to avoid delay in evacuation to C.C.S.; that the clothes of men contaminated by gas fluid were to be removed before they were admitted to the A.D.S. galleries at Wieltje. On a previous occasion during the intense bombardments with mustard gas of the the 28th and 29th of September, all the medical officers at the Wieltje dugout and most of the R.A.M.C. personnel, became casualties owing to gas fluid being brought in on the clothes of the gassed—the gallery was gas proof which increased the danger in this particular instance. The severely wounded and the gassed were to have special "urgent" labels attached to their stretchers so that they might have precedence in transit to C.C.S. The distances were so great and delay was likely to be so considerable owing to the length of the hand carriage and the congestion of the roads that at all stages the utmost despatch was to be observed and all needless redressing of wounds avoided. Fixture of fractures and the treatment of shock, the arrest of haemorrhage, and the administration of food were the only operations permitted in the divisional and corps stations. Despatch was to be the essence of the evacuations.

On the 2nd of October the D.D.M.S. held a conference of A.D.'sM.S. and reviewed the medical arrangements. Two tent subdivisons of the 10th Australian Field Ambulance joined No. 4 New Zealand Field Ambulance at Vlamertinghe Mill. On the 3rd our division moved up its fighting headquarters to Dead End. No. 3 New Zealand Field Ambulance coming under divisional control, two of their tent subdivisions went to C.M.D.S.; half the bearers, to Dead End.

The concentration of the 1st and the 4th Brigades was successfully accomplished; they lay on their taped lines astride the Gravenstafel road in front of Kansas Cross. It was a quiet day; a cloudy sky with occasional bursts of sunshine; the enemy artillery fire slackening. There was a cool breeze and a threatening sky towards evening; it rained during the night. The night was suspiciously quiet, and for this reason—the enemy also were assembling for an attack on the British lines at that very point where the Second and Fifth Armies were massed to advance on an eight mile front in the direction of Passchendaele. The 45th Bavarian Reserve Division and the 4th Guards Division had just been brought down from Roulers; other divisions were to attack further south. The German objectives were Zonebeke and Polygon

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Wood. Our zero hour was fixed for 6 a.m., theirs, probably, a quarter of an hour later. Luck was with the Anzacs.

Rain began to fall at zero hour, a strong south-westerly wind sprang up as our barrage, unusually heavy, fell full upon the huddled masses of the Bavarians in their assembly positions. The going was bad and our battalions, finding the enemy in strength met with considerable resistance; there was heavy fighting but later the enemy surrendered freely and the advance continued. Some heavy shells fell about the Wieltje Post causing casualties there, but by 8 a.m., 50 lying and walking wounded had passed through. By 9 a.m. both divisions of IInd Anzac reported capture of their first objectives and were in touch with contiguous troops. At 10, the enemy shelling about the A.D.S. was much more severe but the wounded were coming in freely; a party of 200 German prisoners were employed as bearers to bring down cases by road from Midland Farm. Towards midday the attack on the final objectives beyond the Gravenstafel Spur was in progress. Reports from the bearer relay posts showed that all was going well. There was as yet no news at the A.D.S. of the whereabouts of the R.M.O.'s of 3rd Canterbury and 3rd Otago, although walking wounded were coming in from both battalions. About this time evacuations from the A.D.S. were temporarily held up for want of cars; about 30 stretcher cases awaited removal. The motor ambulance convoy was delayed by the mass of traffic on the only road at our disposal, the Ypres–Kaaje–Gravenstafel road, now densely packed with lines of heavy lorries rumbling up the narrow way, while enemy shelling added to the delay and congestion. At noon, a counter attack was in progress, but it was a spineless affair and easily dispersed by our artillery, no doubt considerable confusion had been caused to the enemy by our unexpected onslaught and the heavy losses inflicted on his massed assault troops by our rolling barrage. By 1 p.m. our brigades were well established in their appointed positions; consolidation was in progress along the whole front, and large numbers of prisoners were coming in, including a battalion headquarters captured intact with all its important documents at Kron Prinz Farm, an elaborate concrete fortress which we were to use to some purpose later.

By this time some 240 stretcher cases, 490 walking and 80 wounded German prisoners of war had passed through the A.D.S. The number of stretcher cases is remarkable, for the carry by hand was now nearly two miles and the number of bearers employed not much over 200. Already 70 per cent. of the total wounded were in. One R.A.P. still remained "in the air" it was

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that shared by the R.M.O.'s of the 3rd Otago and 3rd Canterbury. In the afternoon there was high wind and rain—one of the bearer relay posts three-quarters of a mile ahead of Bridge House was blown up—7 bearers became casualties, one of them killed. They were still using the boarded tracks from this post, as the road to Wieltje, at least beyond Bridge House, was almost obliterated by shell holes. Duckboard tracks were being put down by our Pioneers almost as fast as the Infantry advanced, and they formed the only routes for stretcher parties, as travel in the crater field was almost impossible. The afternoon became exceedingly wet and cold, and some anxiety was being felt about the position of the missing R.M.O.'s until at 4 p.m. news came in to the A.D.S. as to their whereabouts and parties at once set out from Bridge House to relieve them.

The narrative of the advance of the missing party was not devoid of incident. It starts at zero hour when Captain Barron, N.Z.M.C., of the 3rd Canterburys and Captain Farris, N.Z.M.C. of the 3rd Otagos lay in shell holes behind the white taped lines on which their battalions were marshalled and where they had spent an uncomfortable night. The troops moved off a little before zero as they wanted to be clear of the enemy barrage and be well up to their own when it opened. Behind the last wave came the R.M.O.'s with their 32 stretcher bearers marching in single file in four columns some distance apart. Captain Barron's narrative of subsequent events is easy to follow. "It was a misty morning, the ground was fairly hard but the shell holes made the going slow. Our party carried stretchers, a pannier which I had specially fitted up, a box containing extra dressings and a few splints. Padre Bryan Brown came with me.* There were no casualties, as far as I could see going up, although a good few shells were coming in, a lot of these were "dud" and owing to soft ground they failed to explode, but we were smothered in mud occasionally. Presently we struck a pill box, "Otto Farm" which had been marked off on the map previously by the brigade as a suitable R.A.P. for Otago and myself. It was a large pill box with two narrow windows facing us. There were mounds of bricks about—probably part of the old farmhouse. Outside there were a lot of German dead, the bodies tied in bundles of four with ropes. When we got inside we found two rooms each about 10 by 10 by 8 feet high. There was a four foot passage in front with two windows looking out towards the Hun lines. We blocked up the windows with German clothing and other odds and ends, and the stretcher

22 *Revd. Byran Brown, C.F., attached 3rd Canterbury.

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bearers went off to look for the wounded. A few wounded were coming in: there was heavy machine gun fire on the hill in front." It was now about 8 o'clock. Captain Barron despatched a runner to Spree Farm with a message showing the map reference of the R.A.P. and in case the first became a casualty, another was despatched some ten minutes later. "There was a fair amount of shell fire," says the narrative, "but the pill box we were in seemed a pretty good place—walls 6 feet thick and about 9 feet of concrete overhead. The wounded were coming in pretty freely, some we took inside, mostly lying cases, the rest we put under shelter of the back wall of the pill box. Padre Bryan Brown was a great help in looking after the men. About 10 o'clock, I was getting anxious as no ambulance bearers had come up to clear me, and the wounded were more than the R.A.P. could hold. At last a party from the ambulance reached us, but not enough to clear. About 11 the Hun got on to the pill box and we had it in salvoes—three direct hits on the roof, the concussion knocked us down, it took some time for the dust to clear away. Padre Bryan Brown was outside, he was burying the German dead—they got him." Corporal Munroe, N.Z.M.C., who was a water duty man from the 4th Field Ambulance, was assisting the chaplain at the time when the fatal salvo came. Six shells arrived all together; of these, two burst on the roof of the R.A.P., one hit the side wall. Besides the chaplain, three of the wounded were killed with two regimental stretcher bearers and one German wounded. Several were wounded including the water duty corporal, who was forthwith despatched for assistance to Spree Farm. The party now packed the wounded inside the R.A.P. as best they could and did their utmost to get the walking wounded clear, but this was too much for most of them as they could not find their way to the duckboard track only some 500 yards away. Late in the afternoon Major McCormack, came up with 30 bearers; evidently the two messengers despatched, for some reason or other, failed to bring down the report sent at 8 a.m. This party of bearers could not clear the R.A.P., darkness was falling and it was impossible to carry stretchers from the post except by daylight. Even then it was hard work for the bearers; there was no duckwalk track; six bearers were required for each stretcher; the shell holes were half filled with water and were in places so interlocked as to be unavoidable. Debris of battle, including barbed wire lay everywhere. Over 100 wounded spent the night at Otto Farm, of whom three died during the night.

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By nightfall it was known that our casualties were not heavy. The day had been a very successful one for the British Armies and very costly and disastrous for the enemy. The New Zealand Division had taken 1159 prisoners from four different divisions; the Army had at least 5000 prisoners, and many German dead lay on the conquered ground. Since midday nearly 500 wounded had passed through the A.D.S. At the walking wounded post there was little to be done as the light railways were running the wounded down from Wieltje to Vlamertinghe—about 400 were evacuated in this way—the remainder had been sent down in empty returning lorries during the day. A half ambulance train was run into Ypres during the forenoon, the first to arrive there since 1914; it took away 200 wounded from the southern battlefield. At the corps walking wounded collecting post, the total number of casualties dealt with by No. 4 Field Ambulance was 39 officers, 1944 O.R., including 13 officers, 367 O.R. German wounded prisoners of war. Some congestion resulted at this station which was not well suited to dealing with so large a number of casualites. At midnight all spare bearers were moved up to Spree Farm where Major McCormack now established the main bearer relay post. All posts were clear save Otto Farm, where there were about 30 stretcher cases. The night passed in comparative quiet but heavy rain was falling.

As early as 2 a.m. on the 5th, parties from Spree Farm set out for Otto Farm and by 8 a.m. many wounded had been safely brought in, but the bearers showed signs of the greatest fatigue, their work was hampered by the rain which had fallen during the night. Lieut.-Col. Murray now called up all remaining ambulance personnel; the weather had cleared and it was essential to search the battlefield. By 12 noon the additional bearers arrived at Wieltje. Wounded were coming in slowly, only 38 stretcher cases had been admitted since 8 a.m. An occasional shell fell at intervals about the A.D.S. In the afternoon Colonel McGavin visited the Wieltje station to make arrangements for the relief which was pending. By 6 p.m. all forward posts were reported clear, it had taken full 12 hours to clear Otto Farm; there was two miles of hand carriage which cost three hours of hard trudging to accomplish. The whole journey to Wieltje, three miles, consumed four hours and required relays of 18 men to one stretcher. The day passed quietly enough, and at 8 p.m. the advanced parties of the 2/2 West Riding Field Ambulance had arrived at Wieltje. During the night it was possible to make use of the trench tramways from Bridge House, thus saving a mile

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of hand carriage. Occasionally a Ford car had penetrated along the broken road to this post, but the service could not be well maintained on account of heavy shelling always directed on to the roadway. During the night of the 5/6th the relief of the New Zealand Brigades was completed by the 49th Division.

The 6th of October opened with rain and cold winds, all reliefs were completed at an early hour and command of the sector passed to the 49th Division at 10 a.m. Before it was handed over the New Zealand front line had been consolidated. Two almost continuous trenches had been dug across the 2000 yard front of the Division, well down the forward slopes of Abraham's heights, communication trenches were in forward progress, and mule tracks and duckboard tracks had been pushed forward from our old front line. The single road that led forward to Gravenstafel was as yet not practicable for artillery, but work there was in hand; our engineers were laying down a roadway of heavy baulks of timber clamped with iron dogs. All medical personnel returned to unit in the afternoon; the A.D.S. at Wieltje was handed over. The bearer subdivisions were sent out to the reserve area in motor omnibuses for rest and refitting. The divisional headquarters moved back to Watou.

So ended the successful engagement of Gravenstafel where the 4th Brigade fought its first and last battle and won its spurs handsomely on Abraham's heights. It had succeeded because of surprise and because the weather conditions were at least passable, the ground sufficiently hard to permit of reasonable speed in the advance. The artillery support had been most powerful, skilfully directed and under sensitive control. Our losses were in consequence unusually light. The numbers of wounded and sick evacuated by the A.D.M.S. for the period from noon on the 4th to noon on the 7th were: 1326 wounded; 398 sick; say 16 per cent. wounded in the two brigades and including the killed, 20 per cent of casualties. Both the bearer officers, Major McCormack and Captain Addison, M.C., and their bearers worked hard and with untiring energy. Every acre of the pockmarked ground of our advance was searched and without any assistance from infantry—if we except the German prisoners and some help obtained from our Pioneers during the relief—the N.Z.M.C. bearers alone carried to safety over 400 stretcher cases in two days, a remarkable feat if we consider the nature of the terrain, the length of the carries and the almost complete absence of cover until the galleries at Wieltje were reached.

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Orders had been issued by the Second Army for a renewal of the attack on the 9th. It seemed there was every prospect of obtaining good results by further exploitation of our successes. The positions so far gained in the St. Julien sector gave excellent observation of the northern end of Passchendaele ridge. Preparations were pushed forward for the final assault of the last bit of high ground now held by the Germans. The other divisions of IInd Anzac, the 49th and 66th were now to be engaged. The 49th Division took over the New Zealand positions and medical arrangements; the A.D.S. remained at Wieltje but Otto Farm became a bearer relay post and two advanced concrete fortresses became the permanent R.A.P.'s: Kron Prinz Farm and Waterloo Farm, both well down on the forward slopes of the Gravenstafel ridge. Meanwhile our tent subdivisions employed in the corps stations remained in position. At the mill at Vlamertinghe alterations were made in the dispositions by the erection of marquees and redistribution of personnel so as to facilitate the work. No. 4 New Zealand Ambulance remained in charge and were assisted by tent subdivisions of other medical units of the Corps.

Some short account of the operations of the 49th Division we must consider momentarily as they form an important prelude to the disastrous situation at Bellevue Spur which was the Waterloo of the New Zealand Division. The morning of the 8th of October was cold and windy, all clocks had been put back during the night so as to revert to winter time. The New Zealand Pioneers and Engineers remained in the battlefield struggling with the roading problem; "corduroy" and fascined ways were laid down; all the stores and material brought up by pack mules. The conditions were only too familiar to New Zealand roadmakers, who quell the stormy seas of mud in our backblocks; home-like conditions, but disquieting. In the morning a good drying wind had cheered them on, but evening fell in desperate weather. In the cold cliché of the Corps diary: "The work of forward communications was behindhand, bad weather, since the 5th, had impeded progress." The usual number of muddy walking wounded struggled through the mill at Vlamertinghe. The attacking troops of the 49th Division were assembling at 6 p.m.; heavy rain fell and continued to fall during a night of intense darkness and boisterous wind. In ground that was now a quagmire, correct adjustment of the assaulting line was a matter of chance, all landmarks were obliterated. The disposition of the medical personnel was somewhat similar to

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ours; roughly, some 245 bearers were distributed to the forward posts; an officer in charge of bearers was appointed for right and left sectors. The most forward R.A.P. was at Waterloo Farm, a very heavy oblong concrete fortress lying on the forward slopes of Gravenstafel and about 1000 yards from Bellevue Spur, on the same northern side of what at one time had been the road, but now was in no way distinguishable from the remainder of the tattered forefield. On our side of Gravenstafel Otto Farm, Spree Farm, and Midland Farm, were the principal bearer relay posts, each held over 30 bearers, the reserve of ambulance personnel was still at Dead End.

On the morning of the 9th in fine but windy weather the assaulting brigades of the 49th got away with their barrage but were brought up almost at once by withering machine gun fire from the Bellevue Spur which projected to the north of the sunken road leading up to the highest point of the ridge. Uncut wire flanked the sides of the gentle slope to their right and the steel and concrete walls of the fortresses crowning the Spur, and undamaged by our shells, spluttered with fire from concealed machine guns handled by determined men fighting desperately for the last bit of vantage ground remaining to the Germans on the lost ridges. The British losses were very heavy, the medical situation grave. At least 50 stretcher cases were lying at Waterloo Farm and many others reported to be as yet out in the open. The difficulties were exceptional, the wounded came in as fast as they were cleared; there was a two mile stretch devoid of cover and constantly swept by shell fire. 391 bearers out had brought in only 146 stretcher cases, nearly every stretcher had to be carried three miles by hand over ground in places a foot deep in mud. Infantry were asked for to clear the field but the situation was as yet so uncertain that the troops could not be spared. During the day a steady flow of wet and muddy wounded came to the Mill at Vlarmertinghe: 12 officers and 372 bedraggled men. That night the New Zealand Division was coming in to relieve the 49th.

By 4 a.m. on the 11th the bearers of the 49th Division were exhausted; infantry detailed to assist them owing to a misunderstanding in a telephonic communication, failed to carry out instructions. The evacuations by light railway from Spree Farm and Midland House had not been satisfactory. Trains were erratic, sometimes none for six or seven hours, sometimes three within the hour. The wounded suffered a good deal from cold, lying or sitting in open trucks. The road was impassable for

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cars in front of the A.D.S. In any case it was so blocked by ammunition limbers and pack mules as to be quite unsuited for stretcher parties or horsed ambulances. At 3 a.m. the railway ceased to work.

OPERATIONS AT BELLEVUE SPUR, 11TH TO 18TH OCTOBER, 1917.

At 6.30 a.m. on the 11th, Lieut.-Col. Murray, D.S.O., and Major McCormick, N.Z.M.C., with 60 bearers went up to the A.D.S. at Wieltje to take over, and at 9 a.m. they set out to make a personal reconnaisance. By the trench grid track. they reached Dump House, a bearer relay post, on the Gravenstafel ridge, about 500 yards north of the village site, and half a mile further on, they found Calgary Grange—whose name dated from Canadian times in 1915—where Captain Benham, R.M.O. to the 2nd N.Z.R.B., had his R.A.P. and a few stretchers awaiting removal. Pushing on to Kron Prinz Farm, a few wounded were located in shell holes on the way up and at this most forward and exposed post, Captain Reid, N.Z.M.C., of the 4th N.Z.R.B., had several cases awaiting evacuation. 12 N.Z.M.C. bearers were left behind and Colonel Murray's party ultimately reached Waterloo Farm about midday. Here they saw a long grey structure, consisting of two armoured concrete compartments surrounded by a litter of broken war material of every description. Captain Venables, N.Z.M.C., attached 2nd Otago was here and reported 50 stretcher cases, mostly of the 49th Division, awaiting bearers, while many more were lying out in pill boxes or shell holes in the vicinity. The situation was very difficult, as Waterloo Farm was in full view, more especially from Bellevue Farm, held by the Germans and about 1000 yards distant on a spur which projected into the valley from Passchendaele ridge. A gentle slope fell down from Gravenstafel to the valley of the Ravebeke or Strombeke, about 1200 yards from Abraham's heights. Both Kron Prinz and Waterloo were well down this slope not far from the muddy stream; both were subject to machine gun fire from the Bellevue fortress. The difficulties of clearing these forward slopes, so open to enemy observation, had been thoroughly appreciated by the Canadians in 1915, as when they held practically the same ground, they were compelled to site their R.A.P.'s in rear of the Gravenstafel Ridge on account of the fact that their front line was strongly dominated by Bellevue Spur; this necessitated long carries for the regimental stretcher bearers. Five hundred yards west of Gravenstafel crest, under cover of its slope a fresh bearer relay post was established by us in a concrete dugout called

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Wimbledon. When Colonel Murray returned to Wieltje, he found the A.D.M.S. there and made his report on the medical situation. It was agreed then that the New Zealand Division would clear the 49th Division's wounded and to that end, Colonel McGavin arranged to get 400 infantrymen of the 4th Brigade to clear Waterloo Farm by night as it could not be approached by formed bodies in daylight.

The assembly of our two assaulting Brigades, the 2nd and the 3rd, proceeded under untoward circumstances, the ground on the forward slope was exceptionally heavy, the mud, in places knee-deep, retarding progress. Ultimately the Brigades, the Rifles on the left, the 2nd Brigade on the right, lay astride the road to Bellevue. The N.Z.R.B., in front of Kron Prinz Farm across the muddy Ravebeke with a cemetery on the hill in front of them, the 2nd Brigade still on our side of the creek and in part facing the Bellevue Spur and a sunken road to the south of it. Half a mile away to the right of their advance were "water fields," "marsh bottom," "dad trench"—unknown regions yet—but full of fateful possibilities. In the little time at our disposal—the Second Army was anxious to push on—the medical posts were manned and fresh dispositions made. In the right sector Waterloo Farm R.A.P. was served by a relay at Wimbledon, and on the left, Kron Prinz Farm, had a relay at "Dump House" near Calgery Grange, with a larger post at Kansas House in front of Kansas Cross where Captain McGhie, N.Z.M.C., in charge of this sector, was stationed with 56 bearers. Further back along the road, at Somme Redoubt, Major McCormick, in charge of forward evacuations, had a reserve of 56 bearers to be used in common by both sectors. An advanced walking wounded collecting post was under construction at Spree Farm in a large pill box half hidden in the debris of the farm in which it originally had been constructed. Here, Lieut.-Col. Hardie Neil and parties of No. 3 Field Ambulance were busy clearing the ground for the erection of tents which were to be used as a dressing station and a refreshment booth to be worked by our Y.M.C.A. The light railway had now reached this point but the road from Wieltje was negotiable by Ford cars only, with difficulty.

During the evening of the 11th the weather broke; it rained heavily. Patrols of the Otagos had reported much uncut wire along the front of our assaulting positions. This was bad news. It was cold that night, it rained incessantly and an inky darkness fitfully streaked by German star shells, hid the ugliness of the battle landscape. The enemy were uneasy, their artillery fired

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spluttering showers of gas and high explosive shells into our back areas; Spree Farm was hit twice, the gas causing casualties amongst the bearers. Our own artillery was as yet not all in position: a portion of it was bogged in the mud and could not be dragged in action.

Zero hour on the 12th of October, 5.25 a.m. on a cold raw morning; rain was falling. Our barrage opened, weak and patchy —in places it could not be seen at all—many shells failed to explode in the muddy ground. The 3rd Brigade, on the left, whose assembly was complete, advanced with the barrage and fought their way to the cemetery at Wallenmolen, high ground of importance to us and the British Division on our left, but in a short while found the fire of machine guns, protected by chains of uncut wire, so imperious, that they could make no further headway. The unfortunate 2nd Brigade had little protection from the barrage, such as it was: the men groped their way through a swamp against the murderous fire of the Bellevue fortress, till they were forced to lie down in front of a deep zone of standing wire which some heroic souls had partially penetrated. "The horror of the shell hole area of Verdun was surpassed," writes General Ludendorff in his memoirs describing this terminal phase of the Flanders Campaign, "and through a world of mud the attackers dragged themselves slowly and steadily and in dense masses. Caught in the advanced zone by our hail of fire they often collapsed..... Then the mass came on again; rifle and machine gun jammed with mud. Man fought against man." So the 2nd Brigade came on, losing heavily, but made little progress in the slough of the Ravebeke morasses.

By 6 a.m. the walking wounded were slowly coming down; taking the duckwalk tracks they missed the post at Spree Farm, so that it became necessary to collect them at St. Jean as on the 4th. By 8 a.m. stretcher cases were coming in; the going was very heavy, the road impassable beyond Midland Farm. The small Ford cars had difficulty in getting up even to this post. The railway was available as far as Spree Farm, but part of it was under almost continuous shell fire—nevertheless it had to be used. By noon, it was clear that the attack had failed, and that the New Zealand Division, for the first time in its history, had not accomplished its appointed task. The 3rd Brigade had gained some 400 yards, the 2nd Brigade was hung up with heavy losses by a continuous belt of uncut wire not much ahead of its point of departure. The Bellevue fortress grimly overlooked their precarious lines and belched fire from a score of machine guns;

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further advance was impossible. Of the walking wounded that reached Spree Farm, many were so exhausted that they had to be carried to the entraining point as stretcher cases. Passing waggons and empty ammunition trains helped to carry away the more seriously wounded. At Wieltje only 49 lying cases, so far, had come in. The bearers reported dreadful conditions; the length of the carry from the most forward positions was now three and a half miles, and it was taking six hours at least to bring down one stretcher. The bearer relay post at "Dump House," had been destroyed and several of the bearers killed there. The Wimbledon Post had 25 of its personnel (4th Ambulance) gassed; reports coming in to the A.D.S. showed that our losses were very heavy, especially in the 2nd Brigade sector; it was stated that over 200 stretcher cases were lying in and about Waterloo Farm, and many more in the open in Marsh Bottom, 500 yards from Bellevue Spur. The corps decided that nothing more could be done without sustained artillery preparation; a further attack was cancelled. It was no longer a battle of fighters; it was now a battle of bearers!

The A.D.M.S. came up to Spree Farm in the afternoon. Trains were infrequent and irregular, but lorries with engineer stores were lumbering up as far as this point. Extra stretchers and blankets were sent up by the A.D.M.S., packed on mules, each mule carrying six stretchers. 400 infantrymen were brought up from the 4th Brigade to act as stretcher bearers. By 4 p.m. the full extent of our losses was becoming clear; from 12 noon to 4 p.m. 78 lying, 214 sitting and 440 walking cases had passed through the A.D.S.; it was estimated that there were still 230 stretcher cases to bring in and that 1200 men would be required to clear the field. The N.Z.M.C. bearers had suffered many casualties—a considerable number gassed—others showed unmistakable signs of exhaustion, and had to be ordered to rest by their officers. It may be remembered that before our own attack commenced, the bearers had been employed during the afternoon and night of the 11th in assisting to clear about 120 stretcher cases of the 49th Division. This undoubtedly hampered their own work on the 12th and dissipated their energy before the assault began. It required six bearers working for six to seven hours to bring one stretcher case the 3,700 yards from the R.A.P.'s to Spree Farm, and when the squad arrived it was so fatigued as to require several hours rest. The mud, in places, was knee deep, the bearers were frequently bogged and required the assistance of their mates to extricate themselves. At Waterloo

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Farm the situation was desperate. This long, ugly, grey mass of concrete, pierced with openings so close to the ground that a man must crouch to crawl in, was packed with wounded, and yet more came in all day that had to be placed about the walls outside and in rear of the structure, where they lay exposed to rain, bursting shells, and occasional storms of machine gun bullets. During the morning, the post could be approached only by creeping from shell hole to shell hole. Captain Serpell, N.Z.M.C., 1st Canterbury, who had replaced Major Johns, M.C., Captain Lumsden, N.Z.M.C. 1st Otagos, and Lieut. Rhind, N.Z.M.C. of 2nd Canterbury, had a combined R.A.P. here in the same narrow quarters, where four battalion headquarters of the 2nd Brigade were huddled in the compartment that faced the enemy lines. The R.M.O.'s worked manfully and incessantly; exposed to severe fire they dressed and tended their wounded lying in the vicinity of the fortress. They organised parties of stretcher bearers, brought into shelter those wounded that could be crowded inside the concrete structures, placed the remainder behind the walls or in adjacent shell holes, and did all that could be done regardless of their own safety. Captain Serpell was wounded on the 12th but did not leave his post until wounded a second time and ordered to the rear by his battalion commander. So in some way these medical officers, never relaxing their efforts for 60 sleepless hours, strove to succour the human wreckage that agonised in the swampy valley of the Ravebeke.

Up to this death trap dragging through a hell of mud came the bearers of the field ambulances. One squad leader, Pte. Ivan Paine of the 4th Field Ambulance, in searching shell holes, forward of Waterloo, had his whole squad killed or wounded, but with an improvised party of infantrymen, continued the work of rescue. Another squad leader of the 4th Field Ambulance, Pte. Alexander Stewart, lost three of his bearers but carried on with the remaining two. No less devoted were the squad leaders of the other ambulances, working that day about Waterloo Farm. At Kron Prinz Farm, further north in the valley, and equally exposed, an almost identical situation existed. Two small concrete rooms sheltered 50 men, of whom, the majority seriously wounded. Here Captain Benham, N.Z.M.C., and Lieut. Baxter, N.Z.M.C., both attached to the Rifle Brigade, were working under hazardous conditions. The concrete structure was hit repeatedly by shells which filled the compartments with dust and acrid vapours and drove down heavy fragments from the ceiling on to the huddled wounded below. Close by one of the low windows

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in the foremost compartment a Lieut.-colonel of the Rifle Brigade, sitting on the floor, hemmed in by wounded, for a time directed the movements of his battalion. An ambulance bearer in body armour, crouching in the doorway during a shell storm was pierced in the throat by a fragment flying in through the window and, as he sank to his death, a torrent of blood gushing from his wound deluged the unhappy battalion commander at whose feet the lifeless body fell. Outside there was a hail of machine gun bullets, when any movement could be discerned by the enemy. In rear of the pill box and about it stretcher cases gathered all during the afternoon as the fire slackened. The nearest relay post at Calgary Grange was 1000 yards away through a wilderness of mud, an hour's painful journey, and from there to the crest, near Dump House, the second relay, was over half a mile. At this point the trench grid track began, to the great relief of the bearers. Captain McGhie who was in charge of evacuations in this sector, working from Wimbledon, led his bearer parties on several occasions up to Kron Prinz and in spite of mud—up to the thighs in places—barrage and machine gun fire, got some of the lying cases away; at the same time he directed the walking wounded, who were able to face the journey, to the route of the boarded tracks. In this way many seriously wounded men, assisted by a bearer or in some instances by a German prisoner, staggered back to Wimbledon weak to the point of collapse.

The enemy showed no inclination to counter attack or to leave his concrete fortress; he, too, was counting his losses and clearing his wounded. Our dispositions for the night were: that each brigade had two battalions only in the front line. As night fell, it was known that we had over a 100 prisoners but that our estimated casualties exceeded 2000. The number of wounded passed through the A.D.S. at Wieltje was only 235 lying, 53 sitting and 460 walking. Walking wounded to the number of 38 officers, 1748 O.R., with many wounded Germans, had been tended by No. 4 Field Ambulance at Vlamertinghe Mill.

It rained heavily during the night; it was intensely cold, but there was "quiet" on the battlefield except for a few gas shells in the forward area. With great expenditure of energy, and in spite of all difficulties, the men in the front line were supplied by carrying parties with water and rations. Extra blankets and water were brought up by the ambulance bearers to the R.A.P.'s. All through the night stretcher parties furnished by the 4th New Zealand and the 147th Brigade of the 49th Division led, in many instances by N.Z.M.C. bearers, struggled

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without much success to clear the forward posts. The trains had ceased to run from Spree Farm, but the trolleys were used and were pushed by bearers down to the A.D.S.

By 10 a.m. on the 13th there were at least 500 bearers working, there was still some shelling in the forward area but stretcher bearers were—by mutual consent—allowed to work in peace close up to the Ravebeke. No other parties were permitted to move on the forward slopes, machine guns and snipers saw to that, but a stretcher was a passport; the mud had made a truce, the enemy were no less busy getting in their own wounded. Reports showed that there were still very many wounded to bring in. The 2nd Brigade had 200 at least at Waterloo Farm, the Rifle Brigade 40 to 50 at Kron Prinz Farm. Infantry parties of the reserve Battalions were organised as stretcher bearers to supplement the infantry from the 49th Division. By 4 p.m. only 98 stretcher cases had been brought down to Wieltje in eight hours work but at 5 p.m. a train load of 40 arrived and was followed by others. Up to this time at least 250 infantry had been working along the track to Dump House on the crest and from there through the mud via Calgary to Kron Prinz Farm bringing in with great labour a number of lying cases inadequate to clear the R.A.P. By nightfall some 523 wounded had passed through the A.D.S. during the day; of these over 200 lying. Captain McGhie at Wimbledon, finding it impossible to get more wounded away in the dark, collected all that he could reach and housed them for the night in the dugouts in his neighbourhood. Reports showed that the forward areas were clearing but that there were at least 70 lying wounded at Waterloo Farm of which only 30 could be under cover. Blankets had been carried to the R.A.P.'s by the N.Z.M.C. bearers, the R.M.O.'s did what they could with these coverings.

Early in the morning of the 14th there was heavy shelling on the tracks, both H.E. and gas were used. No doubt the duckboard tracks had been seen by aeroplanes the previous day. The northern track now reached to within half a mile of Kron Prinz Farm and the southern to Abraham's Heights, still very short of Waterloo Farm. These narrow wooden tracks were the only means of approach to our positions and were kept under fire although not subject to direct observation. To clear the battlefield very large numbers of men were required, the A.D.M.S. succeeded in getting together about 1000 in all: D.A.C., the N.Z.A.S.C., the N.Z.F.A., N.Z. Engineers, Pioneers and Infantry. By 8 a.m. one party of 100 from the divisional train with 20

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N.Z.M.C. bearers had made a start from the A.D.S. Captain McGhie had been up to Kron Prinz Farm where Captain Benham reported about 30 stretcher cases, of these only a few not under shelter, but there were still some considerable number to come in from the front line—casualties occurring during the previous day and night. Already 30 bearers had been up, but the journey as far as the tracks was almost as much as they could manage; parties of New Zealand Infantry, Artillery and Engineers, in strength about 500 were on their way up from Wieltje and pushing on to Waterloo Farm. Soon after midday reports showed that the front was almost clear and that all the wounded of the 11th had been collected. By 1 o'clock a train with 88 stretcher cases was unloading at Wieltje A.D.S. Early in the afternoon both Kron Prinz and Waterloo were finally cleared; there were at least 700 bearers working. Casualties were still occurring in large numbers and by midnight the total number of wounded tended at the A.D.S. from midnight on the 11th to 8 p.m. on the 14th amounted to no less than 586 stretcher cases, 112 sitting and 773 walking. During the night the 4th Brigade relieved the 2nd and 3rd Brigade in the front line.

The following day, the 15th, the weather improved but the shelling about Spree Farm, the road west of it, and the A.D.S. at Wieltje increased. Frequently the wounded waiting to be lowered by ropes into the mine shaft were wounded again or sometimes killed as they lay on their stretchers in the roadway. About Spree Farm the condition of the road was fantastic; broken transport, bogged guns, dead mules and a welter of jettisoned ammunition flanked the causeway, our only road for wheeled traffic. The German guns were searching for a large howitzer of ours in the neighbourhood. Spree Farm was repeatedly hit. Beyond on the track the infantry were still assisting in clearing the wounded. The ambulance bearers were by now badly done up after nearly 60 hours continuous work; their feet blistered and swollen, a few already showing signs of trench foot; others so severely chafed about the neck and shoulders from the web slings used in carrying stretchers as to be quite unfit for work. Spree Farm was a place to be avoided that afternoon, constant searching by the enemy's heavy guns ultimately led to the explosion of an ammunition dump, causing a large number of casualties in the vicinity. The total number of wounded for that day was much less, only 167 were evacuated, whereas the sick numbered 342.

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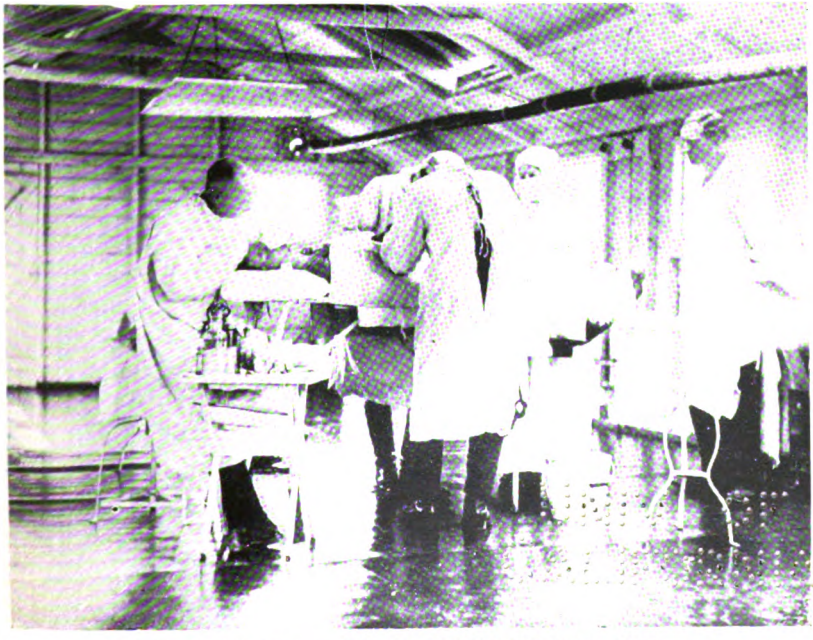
Spree Farm, October, 1917.



Operating Theatre at N.Z. Stationary Hospital, 1917.

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On the 16th the weather was ever so much better, the road was drying rapidly, but the shelling was as heavy as ever. So severe was it about Spree Farm that the post had to be abandoned by the N.Z.M.C. personnel, who were brought back to the Somme post half a mile nearer the A.D.S. The front, fortunately, was fairly quiet. The 3rd Brigade which had not had adequate rest before Passchendaele, as they had been employed in cable laying, now moved out to the Second Army Reserve area near Lumbres and with them went one section of the 3rd Field Ambulance. The estimated casualties for this brigade were 48 officers, 1164 O.R. killed, missing or wounded.

During the week that followed the relief of the New Zealand Division was gradually completed by the Canadian 3rd Division. The enemy artillery fire on the roads, boarded tracks, and back areas was considerably increased; night bombing was intensified. On the 21st the bearer relay posts were relieved by personnel of No. 10 Canadian Field Ambulance. The 2nd Brigade accompanied by the 1st Field Ambulance entrained for the rest area and the Corps Walking Wounded Station was handed over by the 4th Field Ambulance to the 11th Canadian Field Ambulance. The following day the 2nd New Zealand Field Ambulance was relieved at Wieltje by the 10th Canadian Field Ambulance. The weather was fine but it rained in the afternoon and in the evening the 4th Brigade and the 4th Field Ambulance entrained at Ypres. The Dental Hospital which had been at Poperinghe during the operations loaded its equipment on two lorries and departed. Command passed to the Canadians, and by the 25th all New Zealand units were in rest, the headquarters at Nielles in the Lumbres area west of St. Omer.

In reviewing these costly operations at Passchendaele, Colonel Begg makes some comments, which, in order to avoid repetition, I have somewhat condensed. "The IInd Anzac Corps during the month made three assaults; on the 4th, the 9th and the 12th. For the attack of the 4th, weather conditions were favourable and little difficulty was experienced in dealing with all casualties. The heavy cars of the divisions in line were put at the disposal of the Officer Commanding the Motor Ambulance Convoy and were employed in evacuating the A.D.S.'s. The system worked quite effectively and the wounded were evacuated in a minimum time. For the second attack on the 9th the conditions were very bad. The roads were congested with traffic and the battlefield converted into a sea of mud. The greatest difficulty was experienced in clearing the wounded; with six men to the stretcher it took five

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hours to bring in one case from the R.A.P. to the A.D.S. The light railways were unable to run special trains but some cases were brought back to Wieltje by returning empty trucks. The ambulance convoys were frequently held up on the roads for an hour or more by the great congestion of traffic. In spite of difficulties, however, the majority of the wounded were got out, though many remained until the field was cleared by infantry when the Division was relieved. The conditions of cold, wet and mud were much worse on the 12th. The carry by stretcher bearers had extended to 6000 yards (in some instances). Many infantry had to be placed at the disposal of the A.D.M.S.'s to help to clear the field, as it required seven hours for six bearers to bring down a case to the A.D.S. Arrangements were made to gather the wounded into such shelter as was available and they were supplied with blankets and fed until it was possible to remove them. When the conditions are bad and hand carriage is long, at least 600 fresh bearers are required on each divisional front every 12 hours, this in addition to field ambulance bearers. When Infantry are detailed as additional stretcher bearers it is imperative that their own N.C.O.'s and, if possible, officers should accompany them, otherwise they soon become dispersed and are of little use. A.D.'sM.S. should be warned that supplies of blankets and stretchers are not unlimited, and they should ensure that these articles are strictly husbanded and evenly distributed. A maximum of 300 stretchers and 1000 blankets in addition to establishments should be ample and more should not be supplied. From 6 a.m. on the 4th of October to noon on the 13th of October, 2651 stretcher cases were evacuated from the corps front. During this time 2601 stretchers and 10,396 blankets were available for use in the forward areas and all stretchers and blankets coming down by M.A.C. from the forward areas were immediately replaced by the returning motor ambulances, each of which carried 4 stretchers and 12 blankets. It seems clear—as during the ten days each stretcher averaged only one journey—that a proper distribution and use of blankets and stretchers was not made."

Colonel Begg invited the A.D.'sM.S. to furnish an appreciation of a scheme whereby an addition of 200 stretchers and 500 blankets to their existing divisional supplies, could be made to suffice for operations extending over 21 days. Colonel Begg goes on to say that there was difficulty in dealing with slightly gassed men as it was impossible to determine the severity of the case. Gas had thrown open a wide door for malingering, and the undoubted severity of late complications following a condition,

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at first sight not obviously serious, inspired medical officers with an excusable caution in delaying the evacuation of such cases. The final comment of importance made by Colonel Begg is this:—"The present stretcher is unsuitable for long carries over rough ground. A stretcher—like a hammock—slung on one pole could be carried on the bearer's shoulders much more easily and would be a lighter load for returning bearers. Horse drawn ambulances should not be used on narrow roads at the same time as motor vehicles, they only impede traffic." Colonel Begg gives in an appendix the following figures as to casualties:—

Casualties passed through corps dressing stations from 6 a.m. 4th October, to 6 a.m., 18th October 1917:—Stretcher cases: 231 officers, 4,412 O.R.; walking wounded: 131 officers, 6,831 O.R.: totals: 362 officers, 11,243 O.R. The total number of gassed was 12 officers, 424 O.R.

Colonel McGavin in his report on the operations emphasised the fact that when the Division took over from the 49th Division on the 11th there was no time to carry out protective work at medical posts. The time at his disposal was sufficient only to reconnoitre the sector, man the posts and equip them with the necessary medical supplies. He points out that the night of the 11th was occupied in bringing in over 120 stretcher cases of the outgoing division, and that this preliminary work exhausted the N.Z.M.C. bearers before the actual assault took place. "For a time," he says, "the railway service was not in operation, which compelled the hand carriage of certain wounded over a distance of 6100 yards from Kron Prinz Farm to Wieltje, the greater part of the route under shell fire and with mud in places four feet deep. The advanced walking wounded collecting post at Spree Farm, owing to increasing shell fire hardly fulfilled its purpose." On the very important question of stretcher and blanket supplies to the front line Colonel McGavin says:—"The number of relay posts necessitated by the abnormally long and difficult carry increased the number of stretchers required, as large reserves had to be maintained at these posts. The rain and mud necessitated a frequent change of blankets at the relay posts and the A.D.S.; so that instead of three blankets, each patient required six or nine. The supply of stretchers required depends largely on the number of relay posts established. In these operations, owing to the abnormal conditions, the bearers rapidly became exhausted, and at night easily lost their way." The conditions existing, therefore, necessitated many relay posts, at each of which a number of stretchers had to be maintained to

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supply relieving bearers. In addition to this supply it was also necessary to keep a liberal reserve at the R.A.P.'s and relay posts in order to meet exceptional demands. A further large reserve had to be maintained at the A.D.S. for the use of infantry men employed as bearers. Some allowance must be made for losses by shell fire as in the destruction of bearer relay posts many stretchers were destroyed or lost. On the subject of assistance required by ambulance personnel in clearing a battlefield the report of Colonel McGavin is explicit. He says:—"The difficulties of evacuation in this offensive were due largely to an absence of roads and railways in the forward areas, necessitating long carries over very difficult terrain up to a point where wheeled transport became available. Under conditions such as these the strength of the bearer personnel of the medical corps is clearly inadequate, and before operations commence a number of infantry, based on the length of carry and the estimated casualties should be earmarked for the purpose of stretcher bearing. The infantry men should be accompanied by their own officers and work under the direction of the medical officers in charge of evacuations in the forward area. The supply of stretchers required depends largely upon the number of relay posts established. Any limitation in this supply would entail a limitation in the numbers of men employable for evacuation, which means delay in the clearing of the battlefield."

The condition of the wounded brought in during the operations of the 4th were favourable, but very unsatisfactory during the succeeding battles. There was a high proportion of wounds caused by machine gun fire. Penetrating wounds of the abdomen and thorax appeared to be less numerous than usual, but fractures of the lower limbs were much more frequently observed. Trench foot was noted in many cases that had been long lying out in isolated shell holes, and gas gangrene was prevalent, especially in the wounded of the 49th Division, some of whom had been exposed for several days. Of the corps dressing stations, the opinion of the A.D.M.S. as to their functions and utility must be duly weighed. He says in his report:—"There was congestion at the corps walking wounded collecting station on the 4th owing to slowness in dressing. It appeared that cases were dressed unnecessarily, especially as they had only just been dressed at the divisional walking wounded collecting post. The C.M.D.S. was well managed but I am still unable to understand what advantage is gained by interposing a corps walking wounded post and a corps M.D.S. between the A.D.S. and the C.C.S.'s. The corps

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walking wounded station can do no more than the corresponding divisional unit, and the corps M.D.S.'s are not adequately equipped nor have they the time to deal with wounded by complete surgical procedures. The administration of anti-tetanic serum and the inscribing of records could equally well be done at C.C.S. by a staff detailed from the divisions. If the wounded were conveyed direct to C.C.S. from the divisional stations the following advantages would result:—

(1) The staffs employed at the interposed corps stations would be set free for effective surgical work at C.C.S.

(2) The patient would not be subjected to the repeated superfluous dressings; material would be saved and further exposure to infection and shock avoided.

(3) Ambulances and other transport would not be delayed by unloading patients at the corps stations.

(4) Above all, the incidence of gas gangrene is directly proportionate to the time intervening between the infliction of the injury and its efficient surgical treatment. Why, therefore, prolong the delay in the passage of the wounded from the place where they received first aid and the place where they are to receive comprehensive treatment when the delay may mean the onset of serious infection or its progress to such an extent as to entail serious consequences?

To enlarge the C.C.S.'s by reinforcing them with the medical officers and other ranks withdrawn from the corps stations, which could be eliminated and to provide a clerical staff from the divisions for the purpose of making records in a bureau adjacent to the C.C.S., would effect a considerable economy in transport, material, personnel, and would, I believe, save many a life or limb." This opinion of the A.D.M.S., written at the time, based on his experiences at Messines and Passchendaele, demands careful consideration.

In attempting to estimate the casualties sustained during the two operations near Passchendaele, we must first consider the actual number of New Zealand wounded handled by the corps medical units during the period. First, the battle at Gravenstafel: The D.D.M.S. reports that during the period, 3rd to 7th October, the total New Zealand wounded admitted was: 40 officers; 1140 O.R.—figures which approximated to those given in the returns furnished by the A.A. and Q.M.G., namely: 1077 wounded; 80 missing.

During the period 13th to 18th October, which covers the days of the Passchendaele operation, the following report of

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casualties was made to the A.A. and Q.M.G.:—Officers: 38 killed, 74 wounded, 5 missing, total 117; O.R.: 532 killed, 2032 wounded, 615 missing, total, 3179; totals: 570 killed, 2106 wounded, 620 missing, total 3296. The proportion of killed and missing to wounded is very high and most of the missing were killed. The casualties of the two Infantry Brigades engaged were estimated to be 504 killed, 1904 wounded, 327 missing—for the 12th and 13th alone. The total number of wounded of the New Zealand Division evacuated during the same period was only 62 officers, 1828 O.R.; but the figures given by the A.A. and Q.M.G. would include many lightly wounded remaining on duty. The gross total of wounded passing through the New Zealand Divisional A.D.S., including British troops and P.O.W. was: 3087, of which 833 stretcher cases. The official return made by the N.Z.E.F. of the casualties for the month of October as quoted by the G.O.C. in Charge Administration in his reports is probably the most accurate; the figures are: killed and died of wounds, 1536; missing 233; wounded 4309; total 6078.

For the first operation at Gravenstafel the proportion of lying to walking wounded was as 37.5 per cent. to 62.5 per cent., whereas during the Passchendaele battle the proportions were: lying, 27 per cent., walking, 66 per cent. At Messines, out of a total of 3126 wounded passed through the A.D.S. at Kandahar Farm, 40 per cent. were walking cases, 36 per cent. lying. It will be easier to compare these figures by a glance at the following table:—

Messines ..	lying, 36 per cent.	walking, 40 per cent.
Gravenstafel ..	lying, 37 per cent.	walking, 62 per cent.
Passchendaele..	lying, 27 per cent.	walking, 66 per cent.

Transport facilities were exceptionally good at Messines, hence the smaller proportion of walking cases. At Gravenstafel, transport was adequate, the figures representing the norms in all probability; whereas at Passchendaele transport facilities were very bad, hence the smaller number of lying cases. By comparing the figures we arrive at the conclusion that in these battles, characterised by good, fair, and inadequate means of evacuation, about one-third of the wounded required transport on stretchers, while much more than a half could walk a considerable distance to evacuating points and less than 20 per cent. required sitting accommodation.

The casualties in the N.Z.M.C. for the two engagements were not so heavy as at the Somme, but the period of work in the battlefield was of shorter duration. The killed

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numbered 16 O.R.; the wounded 52, including 2 officers. A number of bearers died a few days after the action from gas poisoning. The losses of the 4th Field Ambulance were disproportionately high; 8 were killed in action; 2 died of wounds; 9 of gas poisoning; 25 were wounded or gassed; in all, this ambulance sustained 44 casualties in the bearer personnel, which numbered a little over a 100 men; a most eloquent memorial to the devotion of the bearers and the N.C.O.'s who led them.

During October our losses from sickness were over one-third of the losses in wounded: the average sickness wastage of the Division during the month was 12.4 per 1000 per week, reaching the sinister proportion of 19 per 1000 per week during the last 7 days of the month, when the Division was in rest. This rapid increase in sickness wastage was due partly to the inclement weather, partly to exhaustion caused by the very arduous nature of the operations. The Second Army rate of wastage by sickness during October averaged 10 per 1000 per week: generally, sickness wastages in Army and Division were higher than at the Somme. For the period extending from the 30th of September to the 27th of October, no less than 1392 New Zealand sick were evacuated from the C.C.S.'s to general hospitals; the sickness was serious, therefore; and if we add the sickness wastage to the computed battle casualties we find that the Division lost near 7,500 men during the month. By these losses the Division had reached such a degree of exhaustion as to render it temporarily unfit for further active operations; added to the weakness caused by fatigue, sickness and depleted numbers was a generally felt depression consequent upon our lack of success at Passchendaele and a certain dimming of ardour from which the Division was slow to recover.

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CHAPTER XVI.

New Zealand L.O.C. in 1917.

After a few weeks rest, during which very large numbers of sick were evacuated daily to the New Zealand Stationary Hospital, the Division received orders to relieve the 21st Division and to take over ground recently held by Ist Anzac south of Passchendaele. The Divisions forming IInd Anzac Corps remained the same: the 49th, the 66th, and the New Zealand Division. By 13th November the 4th Brigade battalions were taking over the line, the remaining brigades entraining in the rest area. Command of the sector passed to the New Zealand Division on 16th November, divisional headquarters being at Chateau Ségard in a hutted camp south of Ypres; the bulk of the troops in camps situated in the neighbourhood of Poperinghe and Dickebusch. The sector of defence of 2500 yards comprising two subsectors, each held by a brigade, extended from a small stream, the Reutelbeke, some 1200 yards north of Gheluvert on the Menin road, to a road junction to Reutel a mile south of Broodseinde on the main road Passchendaele-Becelaere. On our front three spurs projected into the valley in front of Becelaere. Our posts lay across these spurs separated by valleys in which small streams ran in a south easterly direction. The southernmost spur was the most elevated, and at its eastern extremity still afforded a slender footing to German troops in the ruins of the Polderhoeck chateau. Our front line consisted of a series of shell-hole outposts, with machine guns covering the undefended intervals; the support line comprised a chain of organised localities linked up by a continuous travel trench; the reserve line, the main position, some 1200 yards from the outposts was held as a continuous line of defence. No Mans' Land was very wide; a condition of semi- open warfare existed. The weather was fine, the ground very muddy, but the sandy subsoil of the new sector was advantageous, as the mud was not so tenacious as that in the heavy clay lands about Passchendaele. In rear of the divisional front was the Polygon de Zillebeke, Polygon Wood, now a muddy pock-marked space jagged with broken tree stumps; within the wood there had been a racing track and, at the northern extremity, the Butte de Polygon, a rifle butt of unusual height—of all this the wood, the track, the Butte—only the latter remained dis-

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tinguishable, a prominent feature in the battle landscape and a nesting place for enemy shells. Galleries driven into the Butte gave shelter to brigade headquarters of the northern sector. The approach was by a plank road which branched north from the Menin road at Burr crossroads. At Hooge on the main road, the southern brigade had its headquarters in dugouts in a large mine crater.

The evacuation of wounded from this sector hinged upon the A.D.S. at the École de Bienfaisence near the Menin gate of Ypres, an historic medical post. It was a M.D.S. during the first battle of Ypres, then an imposing quadrangle of brick buildings of handsome design and solid structure, previously used as an Industrial or Reformatory School for boys, but ever since September, 1914, as a dressing station. Lopped, maimed, and battered by three years of intermittent bombardments it still preserved a trace of its original structure and the stout cellars, now fortified and protected, continued to give shelter to the wounded and their attendants. The 3rd Field Ambulance in charge of wounded evacuations for the divisional front, took over the École, and Lieut.-Col. Hardie Neil assumed command of the bearers detached from the other ambulances. As the building was still subject to artillery fire, work was put in hand by parties of N.Z.E. assisted by N.Z.M.C. bearers in order to improve shelter, to drain the cellars which were liable to flooding, and to strengthen the vaults and dugouts. In the main cellar a well planned dressing room was furnished with every necessary for the comfort and immediate treatment of the wounded, including a liberal supply of oxygen cylinders, and it may be said that this A.D.S. realised all the ideals of perfected organisation which had been evolved during three years of position warfare. The A.D.S. served 4 R.A.P.'s each approached by duckboard walks and as a rule situated in or adjacent to the support line. The bearer relay posts were four in number; one in the southern sector, at Clapham Junction, a point of convergence of many plank walks, on the Menin road about a mile east of Hooge, where there was a detail of two medical officers and 41 O.R. N.Z.M.C.; the second bearer relay was at Hooge Tunnel half a mile ahead of the village site; a third, in the large crater at Hooge. The wounded were carried down by hand along the duckboard tracks to Hooge crater or to Westhoeck where the fourth bearer relay post was stationed at a car post, where there was a loading point for motor ambulance waggons. The route lay along the Menin pavé past Burr Cross road and Hell Fire

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corner, to the École. The longest carry was about two miles; reserves of bearers, blankets, stretchers, dressings and comforts were kept at the bearer relay posts, of which the most important were those at Hooge Crater, and at the Westhoek Car Collecting Post. From Ypres an improvised ambulance train ran daily for the evacuation of sick and lightly wounded; the M.A.C. took the stretcher cases to M.D.S.'s about Vlamertinghe. The divisional rest station was at Wippenhoeck, a hutted camp, and was in charge of the 2nd Field Ambulance while the 4th Field Ambulance had a M.D.S. and a corps recording bureau at Dickebusch. The 1st Field Ambulance had charge of a corps scabies hospital near Remy Siding, where most of the casualty clearing stations were congregated.

Medical and surgical matters of first importance were under consideration at the close of 1917. The year had been notable for a great advance in the surgical treatment of the wounded in front line units. During the Flanders Campaign the staff and equipment of the C.C.S.'s had been doubled, each now had 24 medical officers and manned eight operating tables; the added personnel was derived from the United States Medical Service, comprising many of America's best known surgeons, and surgeons drawn from the Colonial Forces. During the rest periods of the Division, officers from our ambulances were attached to surgical teams with which they worked until recalled at the resumption of operations. In the three and a half months of fighting that followed the 31st July, the total wounded numbered 196,000; of which 60,000, or 30 per cent., were operated on under anaesthetics at the C.C.S.'s where, now, all that was necessary in decisive surgical treatment could be accomplished. The advance of military surgery during the war was an epitome of modern surgical progress since the days of Lister. First, antiseptics to combat the long forgotten suppurations of war wounds that confronted the surgeon in the early battlefields; next physiological methods of wound treatment; lastly, the surgical removal of all damaged tissues with the use of antiseptic pastes, aiming at primarily suture—all efforts at first directed to combatting infection. The next step was the improvement of methods of splinting and fixation in which the Thomas splint was pre-eminent. Lastly came the fight against shock. A study of traumatic or wound shock had been carried out during the past four months by a body of British and American workers in the First Army area; the deductions and working recommendations of this committee were rapidly disseminated throughout the Armies, and

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the preventive provisions recommended put into immediate effect. As it had been shown that during the transport of the wounded man to A.D.S. secondary shock was prone to originate through loss of heat, certain preventive measures were adopted: a special blanket parcel, containing a waterproof sheet and blanket, was attached to each stretcher used in forward areas so that extra coverings should always be available; at the R.A.P.'s every care was to be taken that the patient was well wrapped in the blankets, having several folds disposed under him; the provision of hot drinks was enjoined wherever possible; the R.M.O. was required to ensure that adequate splinting and the greatest care in hand transportation were duly afforded; a small dose of ¼-gr. morphia was recommended as a further measure in avoiding shock by pain. The bearers of the ambulances and the regimental stretcher bearers received special instruction as to the danger of shock and as to the best means of prevention with the simple apparatus at their disposal. The first stage of treatment at the A.D.S. was to be the application of heat to the body by means of an improvised hot air bath made by conducting heated air through a tin pipe from a primus stove into a special folding of blankets; hot bottles and an abundance of hot sweetened liquids were to be used as adjuvants; sodium bicarbonate by the mouth, or 1 per cent intravenously, was to be administered with a view to checking "acidosis," then considered to be a prime factor in shock causation. Large doses of morphia were said to increase "acidosis" but a small dose of ¼-gr. was recommended, as was the intravenous transfusion of 6 per cent. gum acacia in normal saline with the object of raising the blood pressure. On all these matters special instructions were issued and the recommendations became Army Orders.

Another matter of medical importance was the increase in gas casualties. Mixtures of phosgene and mustard gas—some said a new type of gas smelling of sulphuretted hydrogen—were frequently used by the enemy artillery. On the night of the 16/17th November there was a heavy bombardment of our back areas with mixed gases, the "shoot" opened at 11 p.m. and continued until 2 a.m., not without casualties. This type of gas attack, in which there was concentration on limited areas, was now much used by the Germans and realised very material results. Special instructions were issued, the intention of which was to secure earlier evacuation of all slightly gassed men and a greater care in handling this class of casualty and their clothing, so as to minimise ill effects to the attendants.

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Trench foot was frequently seen in the later part of November. During the year ending 31st October, 1917, some 147 New Zealand soldiers were evacuated from the Division for trench foot. The precautions adopted during this period had comprised the use of whale oil frictions to the feet, a daily supply of dry socks and the issue of rubber boots when in the trenches; dry standings were provided as far as possible in forward positions, and hot drinks and food were regularly supplied to front line troops at night. During the coming winter Colonel Begg had determined to enforce the camphor method of prophylaxis, in use in the French army, and already very favourably commented on by the New Zealand Stationary Hospital. The new method included the issue of camphor soap for foot washing, and a camphor borax dusting powder to be used daily with the dry socks provided. The application of whale oil was to be discontinued. In order that the new method of prophylaxis—which is highly efficient against ordinary chilblains—should be well understood by all, a chiropodist from one of the ambulances was, at this time, attached to each bathing establishment, his duties being to supervise the application of the camphor soft soap and the dusting powder and, generally, to attend to any faulty conditions in the bathers' feet. At a time when regular foot inspections could not be carried out with any degree of thoroughness in the battalions, such inspection by a skilled N.Z.M.C. chiropodist was very valuable, especially so for the large detached parties in the camps away from their battalions, who were deprived of the services of the chiropodists, now permanently with the troops in front line and made responsible for the prophylaxis of trench foot. At the baths all must pass the inspection of the N.Z.M.C. chiropodist in attendance, and all had the benefit of his services. The experience of trench foot which the Division had at Passchendaele showed that the puttee was a contributing factor in causation. A contemporary divisional report on the "*Lessons to be learnt from recent operations,*" has the following pertinent paragraph:—"Under conditions such as those prevailing on October 12th and subsequent days, it is a question whether puttees should not be left off before troops go into the line. There appears to be little doubt that the constriction of the leg caused by the contraction of the puttee contributed largely to the occurrence of trench foot, as the average puttee contracts 3½ inches in length when wet. It was frequently observed in advanced medical posts that the puttees of the wounded were very tight and that the feet were visibly swollen, even with the

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boots on, but the men often made no complaint of pain in the legs and feet, nor had they any sense of constriction of the limbs." In spite of all precautions trench foot was much more prevalent during this winter of 1917: conditions in the outpost zone of organised shell holes were such that the nice arrangements of 1916-17 could not be ensured; nor were dry standings possible as in the well drained trenches of the Sailly sector. The number of cases of trench foot admitted during the month of December was 108, so considerable as to cause disquiet in the present sickly state of the Division.

About the time of taking over in the new sector it was noted that the divisional wastage by sickness was extraordinarily high; the mean strength was about 18,700, the sickness wastage averaged 12.8 per 1000 per week evacuated out of army area, whereas the average Second Army rate was 9.1 per 1000 per week: a very unusual rate of wastage. The other two divisions of the corps showed equally high wastage which must be attributed to hardships endured during the Passchendaele operations. Other causes operating in the New Zealand Division were:—an outbreak of rose measles traceable to reinforcements who acquired the infection at Etaples where it was endemic. A few cases had been reported in September and October, but during the rest period, in consequence of crowding in close billets and inclement weather, the disease became general, and the height of the epidemic was reached about the middle of December. Another source of wastage was scabies and the various skin diseases complicating it. Trench fever was disabling an ever increasing number, and trench foot as we have seen, helped to swell the list. The principal sources of sickness wastage on the Western Front could now be attributed to faulty personal hygiene. Of the intestinal disorders, hitherto so fruitful a source of disability in previous wars, there was little left save an occasional sporadic outbreak of dysentery during the late summer months, easily controlled and never very important as a menace to the efficiency of the armies. Far otherwise was it with P.U.O. or trench fever: always prevalent, easily contracted, and difficult to eradicate, where so many men habitually harboured the intermediate host now proved to be the louse. A most powerful waster of armies was trench fever, as it often resulted in prolonged unfitness for active service and as it could be fought only by means of the divisional cleansing stations. But the perfected ritual of personal disinfestation and the efficient cleansing of the clothing were not as yet fully elaborated, the fact that the body louse

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frequently laid eggs on the pubic and axillary hairs was as yet not clearly apprehended by medical officers. Without complete sterilisation of all clothing, inner and outer, of all men of a unit, including their blankets and the thorough application of an ovicide to the body hairs, there could be no reasonable anticipation of total prophylaxis. The treated men mingled with and possibly shared the blankets of untreated; the onset of fever in one made the infection of the other a biological necessity as the louse abandons the infected man shortly after pyrexia develops.

Scabies, with its crippling skin infections, was another disease rife in the Division and added a considerable volume to the flow of invalids from the army area. The disease could be easily detected and the skin complications observed in the bathing establishments, but the treatment was difficult and the complications most refractory. Impetigo, furunculosis, and local abscesses or glandular infections, caused serious gaps in the fighting line; a source of wastage needing control by early segregation, efficient treatment and, again, sterilization of clothing and blankets, in this instance best carried out by means of the Clayton $S.O._2$ disinfectors now attached to the baths. The Army Cleansing Station had now become a key position in the conflict against parasitic invasions: Colonel Soltau is of opinion that no less than 50 per cent. of the total admissions of sick were due to diseases caused by dirt or body parasites, and were preventable by enforcing hygiene of the person and clothing, he writes: "What was wanted was more baths, more laundries, more vermin destroyers, and more adequate provisions to ensure that the soldier had the opportunity of using them."*

In spite of all preventive efforts, except in the periods of heavy fighting, the sick of the New Zealand Division and of the British armies, always outnumbered the wounded. A return of officers and O.R. pensioned in England for disabilities from the outbreak of the war to the 30th November, 1917, showed that while 43 per cent. of the total were pensioned by wounds or other injuries received while on service, 55 per cent. were discharged on pension because of disease. Preventable disease in warfare, not only does it increase the total of human sufferings and prejudice the conduct of war, but what is of greater consequence, it is productive of moral and material effects on the welfare of the race much more detrimental than those attributable to wounds honourably won in the battlefield.

December was cold with hard frosts. The early days of the month saw the Division engaged in a minor operation about

*Official History of the War. Hygiene, p. 9.

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Polderhoeck Chateau. The continued possession of this strong point by the enemy was a source of danger to the brigade holding the southern sector because the chateau machine guns covered the approaches to our front line. Previous attacks had failed to dislodge the garrison, who held on fiercely to the tip of the spur and resisted all attempts to drive them down hill into the valley where the Polygonbeke joined the Reutelbeke in front of Becelaere. The plan approved was an attack by two battalions under moving barrage; the VIIIth Corps, to the north of us, was preparing for an operation to the east of Passchendaele and it was agreed that the two ventures should coincide as to time. The 3rd December, in clear cold weather, at 12 noon, the 2nd New Zealand Infantry Brigade with two battalions attacked the chateau and its works, covering an area of 400 yards wide by 600 yards deep. Our line was advanced some 150 to 200 yards but the final objectives, the Mebus and other strong points were not taken—our stormers were repelled by heavy machine gun fire—our casualties were about 300, and 29 prisoners were taken. Walking wounded and some stretcher cases were coming in to the École de Bienfaisence by 2.30 p.m. There was little shelling of the track leading from the R.A.P. to Hooge Crater. The total wounded passed through up to midnight was 9 officers, 305 O.R. of which, 75 lying, 185 sitting, the remainder walking. The 5th by way of retaliation, the enemy put down a heavy bombardment on our front lines, and an enemy plane, camouflaged by British markings, flying low, dropped a shower of pamphlets of German propaganda written in English. The enemy on the 15th retook from the division which relieved us, all the posts we had gained in front of the chateau. On the 18th we lost Captain Serpell, M.C., N.Z.M.C., who had been decorated for his work at Waterloo Farm: he was killed near his aid post.

General Plumer and the Second Army Headquarters went to Italy on the 20th the New Zealand Division passing into the command of the Fourth Army. Our second Christmas Day in France was exceptionally cold, snow fell in the evening. The day passed quietly except for an affair of patrols: a small party of 20 attempted to raid one of our posts, but was driven back, leaving in our hands a prisoner—a lad of 20—batman to the platoon commander. Turkeys and plum puddings were provided for the men out of the line, and there was a grand dinner followed by a concert at the divisional rest station. For the German troops there was no Christmas cheer—so our Intelligence informed us—their bread ration had been recently augmented;

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they had to make shift with a handful of cigarettes. At midnight on the last day of the year the two Anzac Corps ceased to exist. Ist Anzac became the Australian Corps, to which all the Australian Divisions were now joined; IInd Anzac became the XXIInd Corps, General Godley still commanding, so the name coined and made famous on Gallipoli, was to die out officially in France; but the spirit that it conjured was to live on, immortal, and unconquerable.

We must now leave the Division in their winter trenches in order to glance down the New Zealand lines of communication; the longest, surely, of any British force operating on the Western Front. Our point of departure will be the travelling Medical Board which had been provided by the Division for the purpose of classifying the large numbers of category men accumulated in France during our two year's campaigning and who were employed on a variety of duties in rear of the front line: some at divisional headquarters, others at corps headquarters, some at the stationary hospital and the remainder at the base at Étaples. The Board held monthly sittings at each of these places. The usual procedure was that "C" class men were evacuated to England for repatriation to New Zealand, no "B" class were permitted to leave France, but were detailed for employment at the various points enumerated. The members of the Board, appointed in June, 1917, were: Lieut.-Col. Murray, D.S.O., N.Z.M.C., with Major Guthrie, M.C., N.Z.M.C. and Capt. W. Aitken, M.C., N.Z.M.C. The supervision of the Board was in the hands of Colonel Begg, D.D.M.S., to whom all reports were furnished. An abridged form, N.Z.M. 6 had been devised by N.Z.E.F. Headquarters in London, with the approval of the War Office, it furnished all the necessary information required and was now in use by the Board. In this way co-ordination in the important matter of classification and invaliding Boards and Pensions assessment was attempted.

The fact that the Commander-in-Chief of the N.Z.E.F. was at the same time a British Corps Commander in France, even though dissociated from the so-called Anzac Group, did not prejudice co-ordination of administration; although seemingly an inconvenient arrangement, yet, through the capacity for work of General Godley and the harmonious co-operation of the G.O.C. in Charge Administration it proved workable and efficient. But it may be said, generally, that co-ordination of the medical services in France and in England, was to a certain extent prejudiced by the administrative situation. The N.Z.M.C. in England being under the direct control of the

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D.M.S., Colonel Parkes, whereas the same force in France was under a dual control; that of the D.G.M.S., B.E.F., and the D.D.M.S., IInd Anzac, who happened to be a New Zealand officer, in close touch with the supreme command of the N.Z.E.F. and was, at the same time D.D.M.S. of the corps to which the New Zealand Division was attached and who therefore acted as the channel of communication between the A.D.M.S. Division and the D.M.S. in London.

Interchange of medical officers between the field and the United Kingdom base units, was desirable in many ways, more especially in the case of some junior officers who were hastily qualified at the outbreak of war in order to join the Main Body and on whose behalf the University authorities in New Zealand were pressing for post graduate training in the base hospitals. Such interchange was difficult to arrange satisfactorily because of the not unnatural disinclination of the N.Z.M.C. higher staff in France to part with experienced officers, or to accept in exchange from the base senior officers who had no previous experience of field work. Promotions, at the U.K. Base were perforce influenced by professional attainments, which were of less value with the Division than war wise knowledge. The difficulties of the problem were not made any easier by the medical administrative conditions already outlined.

The New Zealand Stationary Hospital, at Wisques fully staffed, by the energy of their personnel had considerably improved the establishment by the erection of huts and an elaborate roading and drainage scheme. There were 700 beds available and a further expansion to 1000 beds was in course of completion. The class of patient admitted, now in greater numbers than ever before in the history of the unit, consisted largely of the N.Y.D.N. type, but there was also a considerable volume of admissions for P.U.O. and respiratory infections. Pending the completion of the operating theatre and X-ray room no large number of surgical cases could be admitted, but there was every prospect of completing this necessary work early in 1918. At the end of the year Lieut.-Col. O'Neil, D.S.O., relinquished command of the unit, proceeding to England on duty; he was replaced by Lieut.-Col. Hand Newton, N.Z.M.C., late commanding the New Zealand Mounted Brigade Field Ambulance in Palestine.

At the base at Étaples, there were in September some 6650 New Zealand reinforcements, but in November many were temporarily held up by quarantine on account of measles; the N.Z.M.C. reinforcements, of which the divisional medical units

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required over 50 to complete strength, were also detained for the same reason. The Stationary Hospital was able to supply 25 "A" class N.Z.M.C. for the immediate wants of the Division, and the break up of the 4th Field Ambulance, now in prospect, would provide ample personnel to meet all requirements. Major Gordon, N.Z.M.C., had replaced Lieut.-Col. Pearless, N.Z.M.C., at the French base, as S.M.O. and had on his staff two or three reinforcement medical officers.

In England the year 1917 had witnessed a great improvement in the administration of our medical services and a notable expansion and perfection of the arrangements for handling the very large numbers of our sick and wounded arriving from France. The medical headquarters in Bloomsbury Square now comprised:—the D.M.S., Colonel Parkes, C.M.G., N.Z.M.C.; the A.D.M.S., Lieut.-Col. B. Myers, C.M.G., N.Z.M.C.; the D.A.D.M.S., Major McKibbin, N.Z.M.C.; two junior medical officers in charge of Boards and orderly duties, and a clerical staff of 14. Miss M. Thurston, R.R.C., N.Z.A.N.S., Matron in Chief of the N.Z.E.F. had by now completely staffed all the New Zealand Hospitals with N.Z.A.N.S. and had a small reserve of nursing staffs both in England and in Egypt, some of which was employed in British units. The total strength of female staff employed with the United Kingdom medical units had been greatly increased by the substitution of V.A.D.'s and female cooks for "A" class N.Z.M.C., other ranks drafted to the ambulances in France. The changes in the hospital kitchen staffs so effected were stated to have been highly satisfactory, more especially with regard to cleanliness and economy.

A most important rectification in the methods of boarding temporarily and permanently unfit men of the N.Z.E.F. had been brought about by establishing uniformity of the procedure of Invaliding Boards, and by bringing the classifications of the Travelling Board in France into harmony with the categories in use in England. A standing Medical Board was established under the presidency of Lieut.-Col. Acland, N.Z.M.C., the consulting surgeon, who making his headquarters at No. 2 N.Z.G.H. had handed over the surgical division of No. 1 N.Z.G.H. to Major T. M. D. Stout, D.S.O., N.Z.M.C., Lieut.-Col. Acland also presided over the standing invaliding boards which were constituted at the Depots by the addition of the Commandant and the S.M.O.; the inclusion of a combatant officer as a member of the Board being considered an advantage. By these means uniformity in boarding, classification and invaliding was attained.

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A Discharge Depot had been established at Torquay, to which all those found to be permanently unfit, were drafted, but owing to the dearth of overseas transport, this unit, although relieving the pressure in the hospitals, was itself usually much overcrowded. During the quarter ending July 31st, 1917, no less than 599 officers and men were repatriated to New Zealand from this unit. There were two medical officers stationed at the depot, of which Captain H. A. Davies, N.Z.M.C., was S.M.O.

But it was chiefly in the general hospitals that the most important changes were evolving: with the increase in knowledge of military surgery, and the final triumph over the problem of the infected wound, attention was now being directed more particularly to specialisation. Orthopœdics, physiotherapy, plastic surgery, and psycho-therapy were becoming more widely practised and demanded an increase of medical staff with specialised training. During the first six months of the year there had been a chronic shortage of medical officers and trained N.Z.M.C. orderlies, made necessary by the demands of the 4th Field Ambulance in part, and partly by the increase in the number of medical units in England. Expansion of hospital accommodation in order to meet the greatly increased flow of casualties expected during the Flanders Campaign was the first necessity, and as the summer and autumn yielded its thousands of patients, the accommodation steadily increased, but was not, in October and November, sufficient for all New Zealand casualties, as 1500 patients had to overflow to British hospitals. On 30th November, 1917, the New Zealand hospitals accommodated 141 officers, 4441 other ranks, and there was a total of near 6000 New Zealand wounded and sick in the hospitals in England including our own; yet during that month no less than 2799 unfit men had been evacuated to New Zealand by hospital ships and by ordinary transports or direct liner. The numbers to be handled were considerable then: the total for the year exceeded 14,000 sick and wounded evacuated from France, of which 44 per cent. were invalided as permanently unfit for service, while the remainder required at least six months hospital treatment, convalescence, and training before rejoining the Division.

No. 2 New Zealand General Hospital at Walton-on-Thames had now expanded to 1530 beds, huts had taken the place of tents, the Mt. Felix Mansion had been appropriated for wards, and a new operating theatre an X-ray room and a laboratory had been erected in the grounds. A special "jaw" department under Major Pickerell, N.Z.M.C., Professor of Dental Surgery at the

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Otago University, had been opened and was not transferred to the Queen's Hospital, Sidcup, until 1918. At Oatlands Park the limbless had been congregated and, as Roehampton Hospital for limbless was not far away, this arrangement was agreeable to the British authorities. Some attempts at reconstruction were already succeeding. Vocational workshops established by the generosity of the Red Cross Society at Oatlands Park were providing a healthy and educative occupation for the limbless, who by now were estimated to exceed 500, of whom many already repatriated to New Zealand. At the end of the year Colonel O'Neil, D.S.O., took over command at Walton from Colonel Mills, while Major G. Home, late of Brockenhurst, relieved Major Unwin, as Chief of the Surgical Division.

At No. 1 New Zealand General Hospital, Brockenhurst, under the able administration of Colonel Wylie, C.M.G., N.Z.M.C., many beneficial changes had taken place and the accommodation was much increased. A neurological centre was established at Balmer Lawn under the direction of Major Marshal McDonald, N.Z.M.C., who had acquired a wide experience of the psycho-neuroses of war and neurological conditions generally during his service with the French Army in 1916 and 1917. To this centre all "functional" cases were transferred and the results attained were attracting appreciative attention. More arresting from the surgeon's point of view, however, was the first institution of an orthopœdic department at Brockenhurst. With the great advances made in the after treatment of injuries, in which Sir Robert Jones was a pioneer, and the provision of special military orthopœdic hospitals in London, Liverpool and elsewhere, the New Zealand Hospitals were keeping step. Provision had been made by the D.M.S. for the special training in British units of New Zealand surgeons, and at Brockenhurst already there were the elements of a military orthopœdic hospital with its physio-therapy and plaster departments, splint shops and curative workshops, all of which were much perfected in 1918. But Brockenhurst had now become the orthopœdic centre of the New Zealand Medical Service in the United Kingdom. Already representations had been made to the D.G.M.S. in New Zealand to make similar provisions for the after care of the wounded, as certain medical officers returning to the Home Base were to be available for the formation of orthopœdic departments.

Consequent upon the submarine warfare and the frequent interruptions of the Havre-Southampton Ferry Service, the inward flow of patients to Brockenhurst was, at times, very irregular.

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Up to December, 1917, some 7862 patients had been admitted and discharged during the year, and of these, no less than 1303 came in June during the Messines rush, and 1451 during October following Passchendaele. It is stated on good authority that the wounded from Messines were being admitted at Walton within a few hours of the assault; the maximum of 1491 beds was filled within a few days and the excessive work thus entailed in both hospitals caused severe strain on the staff. Owing to the exclusion of British wounded from our two large general hospitals and the fact that they served one division only, at times in a quiet sector, at times engaged in costly fighting, the admissions were so irregular as to necessitate breathless spells of work during active operations and comparative inactivity at other times. But the policy of having our own hospitals justified itself for administrative reasons as well as for the added comforts it provided for our men, to whom a New Zealand Hospital seemed more like home.

At the Convalescent Hospital, at Hornchurch, which now had a capacity of 1,900 beds a very complete Physio-Therapy Department had been established under the direction of two medical officers and a staff of 18 masseuses and masseurs. No less than 30 massage couches were available, with whirlpool baths, mechano-therapy apparatus, radiant heat and light baths, all accommodated in suitable quarters where 400 cases could receive treatment daily. The Y.M.C.A. had also fitted up vocational workshops, wherein a variety of useful crafts were taught. Owing to the growing shortage of foodstuffs in England a small area of land about Hornchurch was put under intensive cultivation for vegetable growing and some attempt was made both here and at the other hospitals to rear domestic animals, pigs, fowls and rabbits, whereby to increase the daily rations.

In the Salisbury Plain group of units No. 3 New Zealand General Hospital, at Codford, was so remote from the ordinary routes of evacuations from France and had so few beds—which hardly sufficed for our own and the British sick of the immediate district—that it had no admissions by convoy. Much representation to Southern Command had so far failed in increasing the hutted accommodation so as to make the complement of beds up to 500. Attached to this hospital was the Venereal Disease Section, a very important department which, as it was a Detention Hospital, enclosed in barbed wire and supplied with a guard, had been at first attached to the Command Depot for rations and discipline. Admissions varied between 30 and 50 a week, the

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proportion of infection being 77 per cent. gonorrhoea, and 22 per cent syphillis. Major Falconer Brown, N.Z.M.C. still in charge, was visited early in the Summer by Colonel Harrison, R.A.M.C. of Rochester Row, and by this officer's recommendations, certain necessary improvements were effectuated; the section was attached to No. 3 New Zealand General Hospital, the staff and accommodation were increased, and the Syphilis Case Sheet, A.F.I. 1238 was introduced into general use in the N.Z.E.F. Colonel Harrison had expressed his entire satisfaction with the methods of treatment in use—which were based on the Rochester Row technique—and with the prophylactic measures which we had adopted in England. For the first six months of the year 1138 cases of venereal disease had been admitted, of which only 223 came from France—50 per cent. of the infection, acquired in England originated in London. Prophylactics were on sale at all New Zealand canteens at a nominal cost, and ablution rooms were provided in each unit; men were warned, as far as possible, of the dangers of infection and the methods of prevention; but practically all cases admitted with disease had failed to use either preventatives or the ablution rooms. At the end of the year there were 400 patients in the venereal section with 200 convalescents attached. Approximately 3600 men per annum of the N.Z.E.F. were infected and required treatment, and about two per cent. of the strength in England and a less proportion in France were constantly sick by venereal disease. This was not a very high percentage, but sufficient to warrant strong efforts directed to reduction. The estimated loss to the State by this wastage was stated to be £70,000 a year.

At the Command Depot, numbering some 2000 men on the strength, Major Bernau, N.Z.M.C. had replaced Lieut.-Col. Pearless, N.Z.M.C. as S.M.O. Additional medical officers were now attached and under Major Bernau's direction classification was brought to a closer discrimination. By means of a card system, each man's status and an epitome of his history was recorded, which simplified the sorting process considerably. The opening of the Discharge Depot had relieved this unit of a congestion of "C" class men, which was very desirable. Physical training was now energised and having in view a possible shortage in man power, a vigorous campaign of combing out was initiated.

At the Infantry Base Training Depot at Sling, there was usually over a brigade strength in four battalions corresponding to the territorial regiments in France. The Rifle Brigade section, 2000 strong was moving towards the end of 1917 into a separate camp

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at Brocton near Rugeley. At Sling the medical staff comprised the S.M.O., Major Hoskins, N.Z.M.C., and four junior officers, each attached to a battalion as R.M.O. As the N.Z.M.C. reinforcement medical officers reported here on landing there was no shortage of medical officers as a rule. The health of the troops in this, a model camp, was always satisfactory; the site was well chosen, the disposition of the hutments and the roading excellent, while all modern sanitary requirements were provided for. The Dental Clinic was fully staffed, and busy, but found that they were less overworked as the year went on, and a higher grade of dental efficiency became noticeable amongst the recruits. But some deterioration in the standard of fitness and the training of reinforcements was already manifest. Certain classes of undesirable recruits were only too frequently arriving with each draft that came from New Zealand: those presenting pre-enlistment disabilities, such as defects of the feet or hernia, and others whose eye defects were such that they could not satisfy the Army Council requirements of visual acuity, more especially men who had lost the use of one eye. Both these types of recruit were, perforce, repatriated to New Zealand as they could not be sent on active service, and the number of unfit available for light duties at the base was already over great. The dangers of over recruiting, now thoroughly appreciated in France and England, were not as yet fully realised in New Zealand. Serious economic loss was incurred by displacing this type of man from his employment and by drafting him overseas at great expense, only to have him returned, unfit, pensionable, and for a time out of employment.

Reinforcements for the N.Z.M.C. had heretofore been concentrated at Sling where there were few facilities for training, but in October it was decided to transfer them to a special depot established at Eweshot in part of the hutted camp occupied by the N.Z.F.A. Reserves. At its inception, the N.Z.M.C. Depot had a strength of 2 officers, 77 O.R. Major A. V. Short, M.C., N.Z.M.C., late D.A.D.M.S of the Division was the first commandant; an admirable choice, as this distinguished young officer had gained a very wide and varied experience during his three years continuous service in the field His syllabus of training and his methods of instruction, more especially his insistence on hospital training and concentration on gas defensive measures, and the best methods of protecting medical aid posts against artillery fire, made the course both novel and eminently practical. To the Cambridge Hospital at Aldershot, nearby, he sent his orderlies in rotation

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for instruction for a period of two months, while the remainder were trained in such operations as were of most importance in the ambulances. The work of the depot attracted considerable attention and much favourable comment. At the end of the year, Major Izard, N.Z.M.C. replaced Major Short, who returned to New Zealand on duty, only to perish during the great influenza epidemic of 1918. By his untimely death, we lost one of the best and most highly trained young officer of our Corps.

Through the generosity of Mr. and Mrs. C. A. Knight, a New Zealand Officers' Convalescent Home had been established at the end of 1915, which was at first controlled by Matron Reynolds, N.Z.A.N.S., but with increasing needs, the establishment was so enlarged in 1917, as to accommodate 40 officers. A medical officer, Major Bernau, was placed in charge of the home, and was succeeded, later, by Captain Chisholm, N.Z.M.C.

In all our hospitals and depots, luxurious recreation halls, clubs and canteens provided with billiard tables, cinemas, and a variety of other means of amusement had been provided by the New Zealand Y.M.C.A. and the New Zealand War Contingent Association, whose staffs of voluntary workers, both ladies and gentlemen, bent every kindly effort towards the task of comforting and helping the sick and wounded with unfailing energy and sympathy. Of special worth was the venture of the War Contingent Association in establishing a hostel in London where men on leave from France could find a home and live under agreeable conditions at a nominal cost. In this work, the administrative capacity and energising activities of a New Zealand gentleman, Mr. Robert Nolan, C.B.E., were always manifest and bore excellent fruits.*

The results of treatment in the New Zealand Hospitals in 1917, showed that 58 per cent. of the sick and wounded evacuated from France, could be made fit for active service again; that less than 1 per cent. died of wounds and that over 40 per cent. required repatriation to New Zealand. Of the latter it was estimated that at least one-third could ultimately be returned fit for general service after a period ranging between six and twelve months treatment and rest; but only a very insignificant fraction of those repatriated were classified in New Zealand as fit for overseas drafts. The repatriation to New Zealand of the temporarily or permanently unfit soldiers of the N.Z.E.F. was carried out by ordinary transports, direct liners or by the New Zealand hospital ships. During the month of November, 1917, the transports *Mokoia*, *Tainui*, and *Ruahine* left England carrying

*The late Sir Robert Nolan, K.B.E.

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1,640 officers and O.R. mostly permanently unfit. The two New Zealand Hospital Ships, *Maheno* and *Marama*, had their regular sailings from New Zealand to Avonmouth, the round trip outwards and home consuming three months.

The *Maheno*, the first to be commissioned, had accommodation for over 400 patients, the *Marama* the larger of the two, carried as many as 565 patients in July and August, 1917, through the Panama Canal. As this hospital ship was the last to arrive in New Zealand in 1917, we may recall briefly the salient events of this her 5th commission, as the voyage and her operations were typical of other commissions of the New Zealand hospital ships. Under the command of Lieut.-Col. Percy Cook, N.Z.M.C.—the master being Captain McLean—the *Marama* sailed from New Zealand on 22nd September, 1917, reaching Albany on 3rd October and called at Capetown on the 20th where 18 officers, 2 Q.U.A.I.M.N.S. and 480 O.R., British sick and wounded, were embarked for English ports. The medical staff on board consisted of 6 officers; 1 adjutant and quartermaster; a dental officer; and 76 O.R., N.Z.M.C. To this complement eight R.A.M.C. orderlies were added to assist with a draft of 50 mental cases embarked and who required close attention. Leaving the Cape on the 24th October, Avonmouth was reached without mishap on the 11th of November. Disembarkation was completed in some four and a half hours which was considered to be slow. Ten days later the New Zealand patients were coming aboard: 23 officers, 2 N.Z.A.N.S., and 522 O.R.; the ship sailing at 10 p.m. on the same day. Colon was sighted on the 5th of December; here representatives of the American Red Cross Society, officers of the Civil and Military Departments and sympathetic friends visited the ship and made arrangements for the entertainment of such of the patients as were fit to go ashore. Many gifts were distributed to the cot cases remaining and the most generous and enthusiastic hospitality was dispensed by the U.S. colony. At Balboa the British Ambassador, Sir Claude Mallet and Lady Mallet, with officials of the Panamanian Republic and the Canal Zone, visited the ship; the up patients were motored to the Soldiers' Club at Panama and much goodwill and expressions of practical sympathy were everywhere manifest. Laden with gifts of all kinds the *Marama* steamed out into the Pacific and, calling at lonely Pitcairn Island, finally reached Auckland Harbour on December 28th, 1917. It was at this time customary for hospital ships and transports to anchor off Rangitoto for some hours prior to disembarkation at the wharf at Auckland. During this interval important adminis-

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trative arrangements were completed. A medical board, including a representative of the Director of Military Hospitals, examined all the patients, the process taking some six hours to complete, during which time the Base Records, Pay Department, and the Returned Soldiers Information Department dealt with each patient in turn. Representatives of the local civil and military authoriites were also present, with a certain number of voluntary workers: in all some 50 to 100 officials and workers boarded the ship at the anchorage. Berthed at the wharf the ship had a civic reception, following which the patients for Auckland, numbering 185, were disembarked. The Director of Military Hospitals, duly warned beforehand, had made all necessary arrangements for the reception of those soldiers who required hospital treatment. The next-of-kin of the more serious cases had, in every instance, received railway passes from their homes to the port and were in attendance to welcome their relatives on arrival. A fleet of motor ambulances and cars owned by private citizens, conveyed the disembarking patients to their homes, the hospital or the ambulance train in waiting. At the other ports of call, disembarkation arrangements were similar: at Wellington; at Lyttelton, where the *Marama* was visited by His Excellency the Governor, Lord Liverpool; and at the final port, namely, Port Chalmers, which the *Marama* reached on January 1st 1918, the voyage having lasted 100 days, during which the ship had transported over 1000 patients. The *Maheno* commanded by the Hon. Colonel Collins, C.M.G., leaving England in December, and carrying 410 patients, was due to arrive in New Zealand just one month later. Over her long lines of communication New Zealand was transporting her soldiers at a net average cost of 14/1 per ton, including hospital ships whereas the B.E.F. rate paid by Australia was 15/2 and the rate paid by the United States under her charters was £1 12s. 2d. per ton; and again the liability of the New Zealand Government, in the event of loss of a vessel, was less by 16 per cent. than under Imperial charters, so that the Dominion could claim not only the longest lines of communication of any British force engaged in the Great War, but could also boast of the cheapest rates of transportation.

By the end of the year, 1917, New Zealand had despatched to overseas forces in all, 88,221 soldiers, of whom 11,487 had been killed or had died as the result of sickness or accidental injuries and 14,141 had returned to New Zealand. Of the returned soldiers, 11,675 had been discharged from the service and of this number 1,167 had been found unfit on arrival at overseas bases

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and had not reached the firing line; while 62,692 remained with the Expeditionary Force. Recruiting was now on a compulsory basis. The Reserve constituted in 1916 by the Military Service Act comprised two divisions of which the first included men of military age from 20 to 46 who were:—(1) unmarried; (2) widowers or married men whose marriage had been dissolved by separation order or otherwise and who had no children under 16 years of age; and (3) married men whose marriage took place subsequently to 1st May, 1915, except such as had children under 16 years by a previous marriage. The 1st Division was to be called up prior to the summoning of the 2nd Division. For the purpose of examining the recruits called up in regulated quota, by ballot, recruiting medical boards were formed in each military district with certain special medical travelling boards whose duties were to examine those recruits who had appealed against the decision of the recruiting boards. The appointments to the recruiting boards were wholetime and for the duration of the war, with the rank and pay—at Expeditionary Force rates, —of a lieut.-col. in the N.Z.M.C. Medical officers were posted to military districts remote from their normal place of abode and practice so that the public might be assured of complete impartiality. A Board consisted of 2 medical officers with a dental officer, an attesting officer of combatant rank, a senior N.C.O., two clerks and an orderly. The Boards sat in various area groups in rotation and were expected to examine from 40 to 50 recruits per working day. The categories of classification were as follows:—"A": fit for active service overseas; "B": fit for active service overseas after prescribed medical, surgical, or dental treatment to be carried out in camp; "B2.": as for "B1" except that the treatment required to make such men fit was to be carried out in their own homes or district hospitals; "C1": likely to be fit for active service overseas after special training; "C2.": unfit for service overseas but fit for home service; "D": permanently unfit for military service. Classes "A" and "B," or "B2." were considered acceptable for service and were recruited; "C1." class had special treatment as will be seen later. The 1st Division ballots were completed on November 18th, 1917; the Division—now exhausted—comprised 82,974 men at the time of the first ballot held at the end of 1916, but the number of reservists actually called up in 1917 was 76,567. Many had voluntarily enlisted. From the 1st of July, 1917, until the exhaustion of the 1st Division, 30,404 were medically examined with the result that 12,556 were accepted—of which 9,806 "A"

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class; the remainder "B" or "C1"; and 17,184 were rejected. The chief causes of rejection in order of frequency being: diseases of the heart, defects of the lower extremity, defects of vision, varicosity of veins, hernia, defects of the upper extremity, impaired constitution, diseases of the ears, flat foot. The proportion of recruits, accepted for service was 41.4 per cent. the rejected were 58.6 per cent. Apart from the general concern expressed at the low rate of acceptability of the recruits, the working of the permanent medical boards appeared to give satisfaction in spite of the fact that appeals were numerous. The proportion of unfit amongst the recruits is easily accounted for by the fact that this class of the male population had already contributed many of its best men by voluntary enlistment.

The environment of the two large reinforcement camps was vastly improved: the new camp at Featherston was well planned and gave hutted accommodation to 7000 troops under the most favourable conditions, while Trentham had restricted its population to 3000, and in both camps, which now represented a capital value of half a million pounds, good roading, drainage, and cheerful Institutes made for greater comfort: while a certain attractiveness had been added by the cultivation of gardens and ornamental grounds, mainly about the vicinity of the camp hospitals. In marked contrast to previous years, the health of the reinforcements in training during 1917, had been excellent: in all, some 36,191 men had passed through the camps—the average population being about 10,000—and there had been 4,104 admissions to hospitals, giving a constantly sick rate of 12.49 per 1000 per annum, as against 19.59 in 1916; a rate comparing very favourably with that of the British army in 1913, which was 23.53 per 1000. . The deaths from all causes numbered 30. A mortality rate of 1.2 per 1000 for the total reinforcements, or, more closely computed, as far as is possible with a floating population, 3.8 per thousand of the mean strength, a rate considerably lower than that of civilian adults of a like age. A most gratifying success had attended the persevering efforts of the sanitary officers: epidemic diseases had been wiped out of the camps; only 14 admissions for pneumonia had been recorded as against 91 in the previous year; and 13 cases of cerebro-spinal meningitis as compared with 107 in 1916, when the total admissions by infectious diseases numbered 1,574, whereas in 1917, they had fallen to 62. The chief difficulties encountered in previous years had been the susceptibility of the incoming recruits, and the rapid spread of catarrhal infections amongst

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what was, to a great extent, a country population with low immunities. The proneness of the newly arrived to acquire naso-pharyngeal infection, measles, pneumonia, and cerebro-spinal meningitis, during the early weeks of camp life had been noted, and formed the special crux of the problem of prevention.

The preventive measures adopted to meet the danger were no less thorough and drastic than they were ultimately successful. The most important precaution was the segregation of all new recruits in special encampments for a full month of quarantine prior to admission to the training section. A Spartan simplicity and rigour was enforced in the segregation camps where the men were sheltered in I.P. tents with floor boards and boarded sides—a type of tent much more familiar to the bushman than the circular tent—and the number of inmates in each tent was jealously limited. The canteens and institutes were "open air" in type, and as the A.D.M.S. Sanitary, Lieut.-Col. McGill, N.Z.M.C. says in his report, "there were no snug retreats." The camp site was roaded and drained and divided into quarters; drying rooms were provided; but there was little protection against high winds save such as was afforded by fences built of manuka scrub. Above all, the absence of closed canteens and institutes, where infections could be disseminated in crowded overheated rooms, and the refusal of all leave to the isolates were measures deemed to be the key notes of the scheme of prevention. During the four weeks of probation—a period sufficient to cover all possible incubations—the new arrival was subjected to a careful bacteriological investigation of his naso-pharynx by throat swabbing and cultural examination. All carriers were, in this way, detected on arrival. The regular use of zinc chloride spray inhalation chambers by all, with special care for those who showed any disorder of the naso-pharynx, and prompt segregation of the carriers of any suspicious or abnormal organism, was the second step taken to rid the camp of the winter plagues. Further, the period of quarantine was put to good use for the purposes of vaccination against small pox, immunisation by T.A.B. and dental treatment, so that by the time the recruit passed from this purgatory into training he was free from the pupillary cares of the medical officer.

In the camps a very efficient sanitary service existed; an area of one mile radius from the camp centre was under military sanitary control, which included visits of inspection to the civilian houses and farms in the prescribed area. All civilians working in camp were subject to throat swabbings

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and frequent medical inspection. The outgoing drafts were examined by swabs for carriers and passed through the inhalation chambers prior to embarkation, the average time consumed being five hours for 1000 men. All patients admitted to the camp hospitals had a prophylactic injection of antimeningococcal serum which, associated with the fact that none of the patients developed the disease as a complication, as was very frequently the case in 1916, seemed to warrant the satisfaction expressed by medical officers in this procedure. So that, in every way possible, all that had been learnt during the previous years of camp epidemics, was now applied in the form of preventive measures in which the medical staff had reason to place full confidence. The V.D. rate in the camps in New Zealand was not high: for 1917 it averaged 3.4 per cent. per annum, whereas the average in peace for the British army in England had been about 50 per thousand per annum and double that rate in Egypt. No prophylactics were on sale or issue, but ablution rooms were provided in the camps.

It has been noted that men in category "C1" were accepted for military service in New Zealand. In order to fit these men for general training, a special "C1." camp was established at Tauherenikau near Featherston. The course of graduated training lasted for from four to six weeks, and was conducted by a special staff of P.T. instructors under the supervision of the medical officers. The results of this graduated training were fairly satisfactory; at the end of the course some 46 per cent. of the men were improved to "A" class and passed to the reinforcement camps, the remainder discharged to lower categories.*

The two military hospitals, under the control of the D.G.M.S. were now well equipped and the various buildings at Trentham provided roughly 200 beds. The new isolation block was completed in 1917, at a moderate cost of £100 per bed and gave accommodation for 54 patients, in all, with separate detached sections for the various infections. Recently the Wellington Racing Club had furnished a ward of 35 beds, called afer their name, W.R.C. and situated near the Cottage Hospital. In September an operating theatre was in course of construction and by the end of the year the Trentham Hospital was able to undertake all necessary surgery for both of the camps. At Trentham, Lieut.-Col. Leahy, N.Z.M.C., had replaced Lieut.-Col. Andrew as S.M.O.; while at Featherston, where hospital accommodation was not so complete, Lieut.-Col. Graham Robertson, N.Z.M.C., was in charge. Two hospitals, destined to expand in the near future, King George V. Hospital, Rotorua, and Queen Mary's Hospital at

*But many were rejected for service in France after arrival in the United Kingdom.

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Hanmer Springs in the South Island, were as yet not fully organised. King George V. Hospital was still partly under public health administration, but had a combatant commandant, while Queen Mary's Hospital at Hanmer was in 1917 recognised as a purely military hospital. Captain Hendry, N.Z.M.C., was the first S.M.O. to this small unit with a bed state of under 100 and accommodation for about 150 cases in all. It had been found that the bracing climate and chalybeate waters of Hanmer seemed much more beneficial to "neurasthenic" soldiers or those invalided for "shell shock" than the active thermal wonders of Rotorua, hence already some indications of specialisation were foreshadowed. While Rotorua seemed destined to become an orthopædic centre, Hanmer was bidding for the position of a neurological division. The civil hospitals and convalescent homes under the control of the Public Health Department still continued to provide for the repatriated sick and wounded of the expeditionary force, and the returned soldiers requiring further treatment. Military wards had been established in most of the larger hospitals, which were so taxed for accommodation as to necessitate the building of temporary annexes. Two important things were lacking: adequate military orthopædic departments and a centre for the special treatment of the psycho-neuroses. New Zealand was lagging behind in these matters; an inevitable consequence of extreme distance from the centres of the rapidly evolving sciences of war medicine and the lack of sufficient personnel trained to the work.

The system of dual control shared by the Public Health Department and the Defence Department in the case of sick and wounded although still in operation, was not satisfactory; it led to duplication of work, some confusion, and above all, to a serious lack of discipline amongst the military patients of civilian institutions. But already the Minister of Defence, Sir James Allen, was moving to have this anomaly remedied as he realised that the care of the sick and wounded of the Expeditionary Force was essentially a function of the Defence Department alone.

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CHAPTER XVII

The German Offensive, 1918.

As sure information of an impending German offensive on a large scale had reached them early in November, the action agreed upon by the Allies, for the first half of the eventful year of 1918, was to stand upon the defensive. The preponderating strength of the German forces on the Western Front, brought about by the collapse of Russia and Roumania, the Treaty of Brest-Litovsk, and the temporary exhaustion of Italy, enabled General Ludendorf to anticipate decisive results from a campaign waged with fresh troops highly trained in the new tactics of the offensive, which he had elaborated during months of training on the quiescent Eastern Front. From November, 1917, to March, 1918, fresh German formations were detraining without intermission behind the lines and gradually increasing the number of his divisions from 146 to 192, until he had at last 23 divisons more than England and France had then on the Western Front. For the Central Powers the time had come for a gambler's throw in which success was essential in order to attack. divide and defeat the Allied Armies peacemeal before the weight of the American troops could turn the scales in our favour. The war must be over before September, for by that time the United States would have 18 fully trained divisions in the field, all having a leaven of troops with war-wise experience gained by *liason* with French or British formations during their period of probation. Germany had much to fear from our relentless blockade and the people's need of food; much to apprehend from Bolshevik propaganda amongst her troops and proletariat; already there were signs of waning morale in certain elements of the Central Powers, more especially in Austria. Heartily weary of the defensive battles of 1916 and 1917, and not a little encouraged by the success and vigour of their counter attack at Cambrai in November, 1917, where the new offensive tactics were first tried out, the German Armies longed for the initiative, but above all, longed with an impassioned desire for a final issue to the Great War: its hardships, privations, and its butchery.

Knowing all this, the Allied chiefs met in conference at Doullens in December and forthwith entered upon the task of making good their defences. Sir Douglas Haig had 60 divisions of British troops, but his Armies were at a low ebb: he was short of reinforcements to

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the extent of 117,000 men; the fighting efficiency of his units was lowered through lack of training for defence due to the constant offensive actions of 1917. The strength of British divisions had been reduced to 10 battalions—three to the brigade—which although in conformity with French and German usage, somewhat disorganised British divisons accustomed to working with 13 battalions, chiefly because it limited the duration of rest intervals and by increasing the period of trench tenure, curtailed the scant time left for training. To add to the difficulties of the Commander in Chief he was obliged to take over some 25 miles of French front south ot Cambrai where his Fifth Army relieved a French Army before the end of the year. A long line of 125 miles to hold, shortage of men, insufficient time for training, especially in defensive tactics, and lack of opportunity to organise secondary lines of defence in great depth, were the chief disabilities of the British Forces in the oncoming battles. By the end of February, 1918, the place and date of the great German offensive was accurately foretold by our Intelligence department. Ludendorf was to break out in overpowering strength towards Amiens and Abbéville at the junction of the French and British armies; to seize the Vimy-Arras heights; to roll up the British line upon the defences of the channel ports and while containing them, to throw his remaining weight upon the isolated French armies, so clearing the way to Paris and the much-to-be-desired German Peace.

The shadow of these great events to come already lay on the New Zealand Division in rest areas about Cassel and Hazebrouck. It was the second occasion upon which General Russell's headquarters had billetted at the old chateau of Renescure; once before, in 1916, on the way to the Somme battles, now again on the eve of greater battles in the valley of the Ancre.

January and February had been spent in dreary weeks of trench fighting in desolate wintry places; our casualties, not heavy, but now more frequently caused by gas, which lodged in dugouts and stole almost undetected upon the drowsy inmates. Another of our medical officers had fallen. Lieut. Haworth, N.Z.M.C., R.M.O. to the 1st Auckland Battalion who had relieved Major Nelson, M.C., wounded at Passchendaele, was killed on the first day of February; a promising young officer not long with the Division. During these two months our total battle casualties numbered 877, of which 25 per cent. wounded by poison gas, but our sick evacuations were nearly double that figure: 1788 in all, of which 730 were suffering from trench fever. Late in February there came a period of rest. Active training for all units was at once put in hand, much use

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being made of combined games and recreational training. Fine weather came early in March which, with the relief from front line occupancy and the wholesome exercises in the open air, did much to restore the health, vigour, and spirits of the Division.

Because of the multiplicity of professional duties thrust upon them, the field ambulances, were not able to devote as much time as was desirable to physical training; there was a shortage of medical officers; some attached to corps formations or corps medical units, others attending the Fourth Army School of Instruction for medical officers; others again fully employed at the divisional rest station at Hazebrouck, or at the various collecting stations for sick in the brigade areas. Reinforcements of men and N.C.O.'s of good physique and excellent morale were forthcoming from the 4th Field Ambulance, now called the Reinforcements Field Ambulance, but the officer shortage was seriously felt by the A.D.M.S. There was much medical work to be done, as the sickness wastage was still unenviably high and attracting serious attention from the D.M.S. of the Fourth Army: Surgeon-General O'Keefe. An active campaign against skin parasitism was in progress. Baths, more baths, and more frequent bathing and sterilization of clothing and blankets were the ideals set by the consulting physicians. P.U.O. was now known to be trench fever, in most instances, and myalgia and D.A.H. were both looked upon as evidences of louse infestation and the sequelæ of trench fever.

Propaganda against venereal infection was wide spread, energetic and, it was hoped, successful. Ablution rooms were instituted in France in all our medical stations and the free issue of prophylatic appliances to the N.Z.E.F. in England—authorised by the New Zealand Government—was stated to have reduced the venereal diseases rate from 3 per cent. to 1.54 per cent. in New Zealand troops in the United Kingdom. Already there was a small, determined, and very audible group of civilians banded together for broadcasting a crusade against venereal diseases, whose urge was perceptibly felt by Dominion Military Authorities. Yet with the prospect of desperate fighting ahead, and in spite of the menace of a thunderous German offensive, the tireless efforts of the medical officer were directed solely to the eternal, never ending domestic struggle with disease.

At the time when the Division marched into the rest area the troops had been warned to stand prepared to move into action at short notice. Something was being done in this direction by the A.D.M.S. The field ambulances and their transport were paraded in turn, the men in marching order, the waggons loaded with the

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authorised equipment ready to take the field on the moment. It was noticeable in these inspections how fit and cheerful the men seemed, and in what good condition they had maintained their transport and horses; they appeared in every way, to the inspecting officers, to be ready for any emergency.

When, on the 21st March the first onslaughts of Ludendorf's initiative fell upon our Fifth Army front, where it junctioned with the French, that very day orders were issued for the Division to prepare for immediate movement. Questions of detail, considered in advance, had been settled: the Division was to move to another Army area by brigade groups, entraining at Cassel, at Caestre and Hopoutre, the motor transport proceeding by road. The A.D.M.S. recalled his officers from outlying duties, directed the ambulances to evacuate their sick to the nearest C.C.S. and despatched the Dental Hospital by lorry to the New Zealand Stationary Hospital, retaining the usual allotment of mobile dental sections attached to the ambulances. All medical stores and equipment in excess of authorised establishment was to be left behind in charge of small holding parties until such time as more thorough disposal could be made. The entrainment was ordered for the 25th, the destination being St. Pol and Frevant in the Third Army Reserve Area in rear of the Arras salient. With the 1st Brigade group, comprising the 1st Brigade and Divisional Headquarters, a company of A.S.C., two companies of the Machine Gun Battalion, and the New Zealand Signal Company, went the 1st Field Ambulance, entraining at Cassel on the 25th. The 2nd and 3rd Field Ambulances, both under control of the 2nd Brigade group, entrained at Caestre the same day, part of their motor transport proceeding by road to Corbie. While still on the move, the Division had countermanding orders directing that the units should detrain at Amiens to join the VIIth Corps of the Fifth Army.

On the 25th Divisional Headquarters were at Corbie in touch with the VIIth Corps, but fresh orders, now issued by the Higher Command, redirected the Division to Mailly-Maillet, north of Albert, where they were to form part of the IVth Corps of the Third Army. Colonel McGavin was at Ribemont, five miles north of Amiens, the ambulances not as yet detrained. In view of the confusing alterations in our detraining orders the A.D.M.S. issued general instructions to the field ambulance commanders to the intent that they were to act, for the present, under the orders of their respective brigade commanders; that they were to make all arrangements as regards dressing stations and collecting posts in conformity with the movements and directions of the brigadiers and that they had

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authority to requisition motor transport for wounded from the 3rd M.A.C. stationed at Corbie. These orders held good until the 27th only, when all the New Zealand Ambulances came again under the direct control of the A.D.M.S. Some confusion and delay in the concentration of the Division had resulted from alterations in the orders issued by the Higher Command, but these amended orders were caused by the rapid fluctuations in the disorganised British lines of resistance. At first ordered to the Third Army in the Arras sector, later redirected to the Fifth Army, near the old battlefields of the Somme, ultimately attached to the right wing of the Third Army, about Mailly-Maillet, the divisional movements were dislocated and, owing to a lack of sufficient busses and lorries at the detraining points, considerably retarded. In order that we may understand the reasons for these thrice amended orders, it is necessary to recall in epitome the events of the past three days.

On the 21st of March, after a short but titanic bombardment—the most furious yet experienced in this war—two German armies launched their attack with near a million men on a 55 mile front from the Sensée river north of Cambrai, to the Crozat canal, south of St. Quentin. Our Third Army in the northern sector, and our Fifth Army in the southern area, opposed the avalanche. Favoured by a dense mist, the myriad diminutive fighting units discharged like electrons from the enemy masses permeated rather than penetrated our thinly held outposts, and flowing along lines of least resistance, had filtered through our front positions, during the first day; in some places, over-running the gun positions. The following day, the mist still aiding, our 30 divisions were driven back in a disconnected line by the irresistible numbers most skilfully handled, no where aggregated, but everywhere perceptible in tiny knots of determined men, handling a wealth of light machine guns closely followed by a greatly daring field artillery. Outflanked and out numbered, our troops withdrew from their main defences, and on the 25th the Germans were in Peronne and Bapaume, having driven us back 10 to 15 miles to the old positions held at the end of 1916, prior to the German retirement. On the 24th it was clear that a grave disaster had befallen; the old battlefields of the Somme, whose historic villages had cost us so much bitter fighting and loss of blood, were being reconquered in a flash by the irresistible rush of our opponents. The spear head of the German thrust had found a gap, ever widening, between the Third and Fifth Armies. Part of the Fifth Army was now south of the Somme, but its left wing, the VIIth Corps was about Mametz and the Highwood; the right of the Third Army was at Hébutere 14 miles from Doullens—we

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were still north of the Somme and in places east of the Ancre covering Albert, but a crisis was fast approaching: if the gap could not be filled, the road to Amiens and Abbéville lay open and Ludendorf's plans would succeed in separating the French and British armies. On the 25th, the most critical day, by agreement between the Allied Commanders at a conference at Doullens, the Fifth British army was transferred to the Third French army under General Fayolles, who became responsible for the defence of Amiens from the westward. Sir Douglas Haig, now freed from this grave responsibility and knowing that French troops were rapidly pushing forward, determined to strengthen his Thrid Army by making the VIIth Corps its right wing, and pouring all his reinforcing divisions into the gap. The danger to the Arras-Vimy positions—which he knew must shortly be attacked—was very pressing, as our continued hold over this bastion was the only guarantee of a successful defence. The 3rd, 4th and 5th Australian Divisions were detraining at Doullens—the New Zealand Division between Amiens and Picquigny—other British divisions were hurrying to the rescue. On the following morning, supreme command of the Allied forces would be assumed by Marshal Foch and that day would prove decisive in the issue of the defence. Meanwhile the German infantry were reported to be at Colincamps, 12 miles from Doullens and our tanks stood guard over the town while the great generals deliberated.

General Russell, on receipt of his orders, proceeded to Hedauville, where in the early hours of the 26th he held a conference of his brigade commanders at which the situation was outlined and action was concerted. The enemy was believed to have crossed the Ancre near Beaucourt, a mile and a half east of Beaumont Hamel; the 62nd Division, now the extreme right of the Third Army, was stated to be retiring from the Ancre north of Miraumont, but would make a stand this day about Puisieux au Mont, 3½ miles north of Beaumont Hamel. The 12th Division, on the left of the VIIth Corps had been ordered to hold the line of the Ancre from Albert to Hamel. The New Zealand Division was to close the gap of about three miles between the right of the 62nd Division and the left of the 12th Division on the line from Hamel, a small hamlet on the Ancre due south of Beaumont Hamel, to Serre north of the latter about 1½ miles. The centre of the New Zealand line would be Beaumont Hamel with Hamel to the south and Serre to the north of our front, which was to face almost due east on high ground overlooking the Ancre Valley. The concentration point ordered for all units was Hédauville, six miles north-west of Albert, on the main

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road to Doullens and all units were now being hurried to this centre from their detraining points. A composite brigade was pushed on at once; it consisted of three battalions arriving piecemeal by marches from Pont Noyelles, at which point they had left the busses and lorries. The first battalion of the N.Z.R.B. leading on through pleasant cultivated country, first checked the advancing German parties on the road to Hébuterne from Mailly Maillet, and established touch with the 2nd Division of the VIIth Corps. Shortly after other New Zealand battalions of the 2nd Brigade were coming into action from Hamel northwards. About Beaumont Hamel, old British trenches of 1916 were occupied, and as other units arrived the line expanded further north, but not without fighting of a determined nature, so that by evening a continuous front had been formed which partly filled the gap north of our line as far as Hebuterne, where the old 4th Australian Brigade of Anzac days was again fighting shoulder to shoulder with the New Zealanders.

Meanwhile the ambulances were marching up to Hedauville, but it was not until the afternoon that the 1st New Zealand Field Ambulance, under the command of Lt.-Col. Craig, N.Z.M.C., was fully concentrated. They had detrained at Amiens that morning, the personnel proceeding by busses to Pont Noyelles, whence they marched the 10 miles to Hedauville. The horsed transport, which had trekked from the detraining point, arriving about 5 p.m., made the unit complete and immediate steps were taken to establish an A.D.S. at Mailly-Maillet, four miles further north and about 3½ miles in rear of Beaumont-Hamel, the centre of our divisional front. From the A.D.S. at 10 p.m. a party of 50 bearers under Captain E. M. Wyllie, N.Z.M.C., went out to collect the wounded, of whom they cleared 150 without difficulty to the M.D.S. established at Hedauville. The 2nd and 3rd Field Ambulances reported during the night. The movements of the motor transport of the 2nd Field Ambulance had some spice of adventure: on the 25th part of it reached Corbie and received orders to proceed to Ville-sur-Ancre, where they joined their own billetting party under Captain Addison, M.C., N.Z.M.C.; here they parked the cars near the church and turned in for the night. The party, consisting of 2 officers, the interpreter, and 10 O.R., with 3 motor ambulances and 2 motor cycles, were roused at 1 a.m. with orders to evacuate the village immediately as the Germans were advancing. As our party moved out they saw behind them a huge fire at no great distance, which was stated to be the burning of Bray-sur-Somme that our troops destroyed before evacuation. That night the German advanced

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parties were near Sailly-sur-Sec only four miles from Corbie—little more than 12 miles from Amiens.

On the 27th the divisional front, not yet wholly stabilised, was subjected to several determined attacks. The enemy shelling, increased in volume, fell upon our lines as far back as Mailly-Maillet and Hédauville, but three separate assaults were driven off by our machine gun and rifle fire with substantial losses to the attackers and in the evening local counter attacks by our infantry re-established and advanced certain portions of our line. The divisional transport concentrated about Hédauville was drawing fire from the opposing artillery, so much so that it was now moved out of the vicinity of the village and the 2nd and 3rd Field Ambulances were ordered to Bertrancourt in divisional reserve, and later divisional Headquarters, withdrew and re-established their offices at Bus en Artois.

Our wounded collected from the R.A.P.'s during the night numbered just under 300 while 100 British and some 30 to 40 prisoners of war wounded passed through the A.D.S. at Mailly-Maillet. No. 3 Field Ambulance at Bertrancourt opened a tent subdivision and received 140 British wounded from the division on our right. No difficulties were experienced in these evacuations, all R.A.P.'s were easily cleared to a collecting point practicable for cars near Achonvillers, thence to the A.D.S., and as rapidly as possible to the M.D.S. of the 1st Field Ambulance in buildings at Beaussart. The M.A.C. of the Vth Corps cleared along the road that led from Beaussart to Bertrancourt, thence through Louvaincourt and Marieux, where Corps Headquarters were, to the 3rd Canadian Stationary Hospital in Doullens. Lt.-Col. Murray, D.S.O., stationed at Mailly-Maillet, assisted Lieut.-Col. Craig in establishing his forward evacuating zones and by the following day, as the enemy had ceased to advance, evacuations were proceeding along the usual lines of position warfare. The ambulances were now withdrawn from the command of brigades and No. 3 Field Ambulance was instructed to establish a divisional walking wounded collecting post near the M.D.S. at Beaussart.

By the 28th the worst was over in the Somme area; French troops were now present in strength; there seemed every prospect of the Amiens defences proving stable, solid and impenetrable. But the enemy's plans were culminating in the great blow struck this day at the Arras sector. By this assault the Germans hoped to turn our vital positions at Vimy and to break down the right shoulder of their salient. The powerful attack on a 20 mile front from Puisieux to Oppy penetrated our forward zones, but was brought to

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a stand in our main lines of defence. Clear weather gave the British artillery and machine guns their full defensive value, the result was a crushing repulse and the complete wreck of Ludendorf's greatest battle. "Like a sturdy oak fast rooted in the great bastion of the Vimy Ridge, the British Army bowed to the hurricane that swept upon it; its branches whirled back westwards, whipping and bending in the gale; but the trunk stood unbreakable, and the grip of its roots could not be loosed."*

On the front of the New Zealand Division whose brigades had now been reformed, there was no serious assault on the 28th, but the other two divisions of the IVth Corps, the 42nd and the 62nd repelled attacks successfully; the main fighting was further north. Our own artillery was now in position and actively engaging enemy columns moving in the Ancre Valley, over which our positions gave us very good observation. The 3rd Brigade, in front of Colincamps on the road to Serre, carried out a minor operation necessary for the rectification of their line which, after some obstinate fighting, they brought to a partial conclusion towards nightfall, taking six machine guns and some prisoners. Heavy rain fell in the afternoon, the day was cold; the enemy shelling which had increased in strength during the afternoon fell with marked intensity about Colincamps, where Brigadier-General Fulton, C.M.G., D.S.O., commanding the 3rd (N.Z.R.) Brigade had his headquarters. A heavy shell falling upon his billet, penetrated the cellar where he and his Brigade Major, Robert Purdy, M.C., were working. Both were killed, while several others of the brigade staff were killed or wounded. General Fulton had led the 3rd Brigade since its formation, and was conspicuous in his successful handling of the unit which he had helped to form and to train. Major Purdy was the eldest son of our D.M.S., Col. Purdy, N.Z.M.C., and was one of the most popular and efficient young officers in the division.

In anticipation of the attack, the A.D.S. at Mailly-Maillet had been reinforced; extra bearers and runners had been supplied to the R.A.P.'s, of which two were in Colincamps for the left sector, two at Englebelmer for the right sector, while the central R.A.P.'s were in Mailly-Maillet. All had good roads of approach. At each brigade headquarters an N.Z.M.C. runner with a bicycle was attached so as to maintain touch with the A.D.S. In the afternoon the A.D.M.S. visited the D.D.M.S. IVth Corps, Col. Pollock, R.A.M.C., at Marieux; our immediate requirements were extra stretchers, blankets and hot bottles. Owing to the reduction in equipment necessitated by rapid movement the ambulances had been obliged to shed all the wealth of extra equipment which was permissible during the long period of

*Sir Douglas Haig's Command, page 131.

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trench fighting and position warfare. Each ambulance had now but 76 stretchers instead of 150 as previously and their stock of blankets was reduced from 400 to the regulation number of 150. But the large reserves held by corps had also been dissipated or handed over during the retirement and, owing to the withdrawal of the C.C.S.'s, supplies, were not immediately available. The retirement had been well carried out, not one C.C.S. was taken by the Germans and in no instance had any wounded been abandoned by them, although medical stores and equipment were lost in quantity. There was another difficulty: the 27th M.A.C. had excessively long journeys to perform as most of the C.C.S.'s had moved from Doullens to St. Pol, the return journey taking 12 hours to the latter point, so reducing the supply of cars available for lightly wounded, who had to be detained at the M.D.S. To obviate this it was suggested to the A.D.M.S. that a light railway running from Albert to Doullens was practicable as far as Acheux, about 3 miles south-west of Bertrancourt on the main road Albert-Doullens.

The situation on our divisional front was very quiet during the day of 29th March, there was little enemy fire of any kind. A few shells fell in the back areas about Bertrancourt; the weather was dull and cold, limiting observation, and transport had been removed from the vicinity of the villages and disposed in small parcels so as to offer fewer targets. At Acheux railway station, Lt.-Col. Hardie Neil, with details from his 3rd Field Ambulance had made satisfactory arrangements for an entraining point for lightly wounded: in the station buildings he had accommodation for a dressing room, a shelter for the wounded, a cookhouse, and a refreshment counter with other necessary provisions. At Beaussart, in the school house, he had established his walking wounded post and for transport he was given all the horsed ambulance waggons of the divison. No. 2 Field Ambulance was stripped of its stretchers to supply the A.D.S. and forward posts and 1000 blankets were obtained from Amiens from the divisional supplies and held in reserve by the A.D.M.S. The total wounded for the day did not exceed 46, but one medical officer, Captain Ardagh, attached to 1st Auckland was amongst the number. The A.D.M.S. who for some time past had been eight officers short in his establishment, and who had not as yet been able to obtain the necessary reinforcements, was obliged to apply for six R.A.M.C. officers to replace his casualties. But his reinforcements in N.Z.M.C. officers were to join the Division early in April.

On Easter Sunday, a mild day with constant showers, our centre and left brigades provided an assaulting party of four

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battalions to carry out an important minor enterprise destined to considerably improve our front-line. The La Signy farm position was an eminence which dominated the communications, of our left brigade more especially, and being the highest ground for many miles around, gave a wide field of observation to its occupants. The New Zealand Division determined that they alone should enjoy this tactical advantage. The position resembled somewhat that at Polderhoeck Chateau and the possession of a 1000 yards of trench line in front of a hedge some 300 yards to our side of the farm site, gave the 20th German Division a dominance over our lines, which it was desirable to subdue. The farm site itself was of no importance as the hedge trench was on the crest of the ridge and this very point had been our principal artillery observation post when the 27th Division attacked Serre early in the Somme Battles of 1916. Under cover of a barrage part of the N.Z.R.B. and part of the 1st Brigade advanced over 500 yards to the attack; the 1st Brigade was at once successful; the 3rd Brigade, meeting with a more obstinate defence, lost considerably, but with steady determination ultimately made good in the early hours of the 31st, so that the whole position fell into our hands. Our total casualties were about 200 killed and wounded, chiefly suffered by the 4th Battalion, N.Z.R.B., but we took 3 officers, 287 O.R. prisoners with over 100 machine guns. The medical arrangements worked without a hitch. Three R.A.P.'s near the fight were in a sugar factory on the Serre road, about a mile and a half in front of Colincamps, and at a road junction to Mailly-Maillet. From 6 p.m. on the 30th to 6 a.m. on the 31st, 131 New Zealand wounded passed through Mailly-Maillet or Colincamps with some 30 to 40 wounded prisoners, and later during the day, over 50 New Zealand wounded were brought in, the total tended by the advanced medical posts being about 180. From the M.D.S. at Beaussart the M.A.C. cars were available for lying cases, the walking wounded collected by the 3rd Field Ambulance were driven in the horsed ambulance waggons to Acheux station where they were fed and cared for by a party of 1 officer, 20 O.R. detached from the 3rd Field Ambulance. The narrow gauge railway, temporarily interrupted by a smash in the line near Louvencourt, caused by shell fire, was repaired and a train left late in the afternoon, carrying some 366 walking wounded, of which 168 were New Zealanders, the remainder from the division on our right. Colonel Hardie Neil by improvised means had adapted one of the small covered trucks to take stretcher cases. After a journey of about 15 miles the incoming train was met at Gezaincourt, close to

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Doullens, by a small detraining party under an N.C.O. furnished by No. 3 Field Ambulance; the wounded were received by No. 4 C.C.S. now in Doullens.

Our new positions gave a fine view over the Ancre valley to Thiepval, Pozières and the Albert-Bapaume road. Flers lay in that direction only 7½ miles away and to the north-east, Bapaume at about the same distance. The Division was highly elated and congratulatory messages flowed in from many quarters from our old chiefs Birdwood, Plumer, Godley and also General Monash now commanding the 3rd Australian Division and fighting hard south of us, whose old brigade the 4th Australian, comrades of Anzac, were on our left hand at Hébuterne during the crisis.

The opening days of April were quiet enough. There was occasional rain, but the weather had improved and the roads were drying up satisfactorily. A party of N.Z.E. aided by the N.Z.M.C. bearers had much work in hand for the protection of the A.D.S. at Mailly-Maillet which was subject to an increasing amount of enemy shelling. Adjacent to the building was a large brewery with substantial vaulted cellars which they connected with the A.D.S. cellar by breaking through the dividing wall. The vaulted ceiling of the brewery cellars was strutted with heavy pit props and above it was erected the usual "bursting course," consisting of concrete slabs on iron rails supported by sandbagged buttresses. As warnings of the imminent use of gas shells by the Germans were to hand all doors were securely gas proofed. At the M.D.S. at Beaussart, also very exposed to bombardment, similar work was undertaken; we had already suffered casualties amongst the medical personnel, both here and at the A.D.S. The civilian population had abandoned both these villages, now fast caught in the battle zone, but at Bertrancourt some few old people and invalids remained, and as it was very undesirable that they should continue to live in the village they were removed by French motor ambulance cars. In the school and some Nissen huts, close to the prisoners of war divisional cage No. 2 Field Ambulance established a sick collecting post with about 50 patients.

The experience of the last 10 days of March had demonstrated the importance of divisional medical units retaining their mobility. The pushing forward of the C.C.S.'s during the three years of static warfare had to a certain extent limited the usefulness of the main dressing stations. During the rapid withdrawal of our divisions from the Hindenburg line while the M.A.C.'s were fully employed in removing patients from the C.C.S.'s, the motor ambulance cars of the divisions were used in many instances to

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carry wounded back to the C.C.S.'s so losing time on account of the great distances to be covered, and entailing the abandonment of lying cases collected by the bearer subdivisions. With these considerations in view the D.G.M.S., Surgeon-General Sir Arthur Sloggatt, on the 2nd April, directed that field ambulances should select alternative positions for their M.D.S.'s in échelon behind the posts held at the moment, so that, in cases of retirement, the rearward posts, manned in time, would be available and to a certain extent prepared; and, further, that on no account were the motor ambulance cars of the divisions to evacuate wounded direct to C.C.S.'s but were to be employed only from the bearer collecting posts to the M.D.S. In compliance with these orders General McGavin, on 3rd April, instructed the O.C. No. 3 Field Ambulance to select an alternative site for the Divisional M.D.S. Louvencourt was ultimately chosen, as being most suitable, and a party from the 3rd Field Ambulance was detailed to take over the schoolhouse and the Mairie at an early date from the 14th Australian Field Ambulance at present stationed there.

The end of the week saw the German assaulting columns making their last general attacks on the Amiens positions. A portion of the advancing masses fell upon the New Zealand Division on the 5th. At 5 a.m. a very heavy bombardment—the heaviest yet experienced by our troops—fell upon our front line and back areas, concentrated with especial intensity about Beaussart, Bertrancourt, and as far back as Bus en Artois. Following this, powerful attacks by storm troops were launched against the left of our line; the outposts at La Signy Farm were driven in but our trench on the crest held firm; all assaults were beaten back with heavy casualties to the attackers. In the afternoon the 2nd Brigade on our right felt the weight of the enemy and dealt with him as the Rifle Brigade had done, adding to their triumph the bringing down of a low flying aeroplane whose pilot and observer they captured. During the bombardment of the front line we lost another medical officer, Lieut. Roy Harris, N.Z.M.C., R.M.O., to 1st Canterbury. His R.A.P. in front of Engelbelmer was in a shell hole close to his battalion headquarters; there was an old trench line just in rear of his improvised aid post upon which the barrage was accurately directed. While moving his medical detachment to a place of greater safety, he was killed. There were no wounded in the post, but he did not leave it until the whole of his party was safely away. He was the second R.M.O. of 1st Canterbury to be killed, as he had relieved Captain Serpell, M.C. in December, 1917. The bombardment was more concentrated about Bertrancourt Village than even at

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Beaussart: so severe was the shelling that it became necessary to clear the ambulance station, the sick being distributed in the fields. Before 9 a.m. the school yard was half filled with stretchers awaiting evacuation—our own ambulance cars had to be used for the purpose —in the work of evacuation one of the motor ambulance cars, fortunately unloaded, was destroyed by a shell which killed the driver and wounded the orderly, while several Germans and a few of the N.Z.M.C. personnel were killed or wounded near the Nissen huts in the German Prisoners' Compound. The provision made by the A.D.M.S. for a dressing station at Louvencourt was now found most useful, as the sick were transferred there during the afternoon and a small holding party only left in Bertrancourt. The divisional walking wounded collecting post at Beaussart was much damaged by high explosive shells and, as the road was barraged, it became necessary to shelter the lightly wounded in the church. Acheux railway station became untenable so that Lt.-Col. Hardie Neil was obliged to open a new entraining post at Louvencourt, 2½ miles further back by road, and at this point on the light railway, 277 patients were safely entrained in two trains during the day. No. 3 Field Ambulance now took over the sick collecting station—evacuated from Bertrancourt. At Mailly-Maillet heavy shells had fallen in the village but the work of the A.D.S. was not interrupted although Lt.-Col. Craig had a few of his men wounded. The total casualties admitted to the divisional posts numbered close on 350; of these 250 passed through the M.D.S. at Beaussart. Most of the wounds were of a severe nature as they were caused by shell fire and in marked contrast to the lighter type of bullet wound more commonly treated during the previous week. The N.Z.M.C. casualties included 3 killed, 8 wounded.

The 6th was deemed a "quiet day" although the shelling still continued, but in diminished depth. A fresh attack, on our left, had to be beaten off by our artillery fire and the battle still raged to the south of us. Our line, however, was by now well established on a favourable position and behind our front trenches a heavily wired main position had been constructed by the N.Z.E. and the Pioneers. The morale of the Division had never been more exalted and our infantry were well prepared, even eager, to meet any assault the enemy might choose to fling upon them. During these stirring days of semi-open warfare our losses had been heavy and were estimated to be:—550 killed, 1800 wounded and a few missing; but we had more than held our own, we had actually taken something from the Germans in the shape of territory, prisoners and material.

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But the crisis of the Somme battles was passed, the way to Amiens and the Somme estuary was stoutly barred, and the tide of the German eruption was setting towards our northern flank about Estaires and Armentières. Already we were reverting to the old impasse of trench fighting and the routine of position warfare. The principal work of the N.Z.M.C. during the rest of the month was concerned in strengthening the various forward posts and improving the protection of the A.D.S. at Mailly-Maillet. Battle casualties averaged about 40 per diem, and although shell fire was considerable, the evacuation of the wounded presented little difficulty; good roads in most cases permitted the use of wheeled stretchers as far as the R.A.P. and the rolling nature of the country gave such concealment as enabled the motor cars to come well forward unobserved. At Louvencourt No. 3 Field Ambulance was holding 150 sick and continued to despatch the usual daily service of trains to Gezaincourt; the return journey took three hours to complete and with four coaches and four trucks there was ample room for 300 sitting and 56 stretcher cases. A bathing station near the ambulance had been reestablished and the usual fight against parasitism was renewed. But as ever happens to an industrious division, no sooner has it made comfortable local arrangements, than some other unit steps in to reap the advantages. At the end of the month, owing to the necessity for the Division "sidestepping" to the north so as to cover Hébuterne the well protected A.D.S. at Mailly-Maillet, which now had shell proof cellar accommodation for 100 stretcher cases and was well lighted by a derelict acetylene plant discovered by us in the abandoned village, had to be handed over to units of the 12th Division, who relieved our right subsector, and the readjustment necessitated taking over an A.D.S. at Sailly-au-Bois about a mile and a half west of Hebuterne. No. 2 Field Ambulance was instructed to make the necessary arrangements while No. 1 Field Ambulance had orders to erect a M.D.S. in tents at Bus en Artois close to the fringe of the Chateau Woods. Steps were taken to put the Sailly au Bois A.D.S. into a proper condition of defence as it was wholly unprotected and consisted of rooms in a vacated estaminet situated on the main road. On the very afternoon on which we took over, Lt.-Col. Murray had 1000 sand bags filled to block all the windows, the next day beams taken from buildings already wrecked by shell fire were collected and placed over the roof and covered by sand bags filled with broken bricks so as to provide a bursting course. The outside walls were next strengthened by a breast work of sand bags filled with chalk blocks; this gave protection from small shells at least. As there was likelihood of heavy

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bombardment it seemed advisable to construct "according to the art," a much more secure retreat. With the aid of a squad of infantry, some engineers, and all available bearers, a cutting 47 feet long, 12 feet broad, and 15 feet deep was made at the back of a stable in rear of the estaminet. With the spoil, sand bags were filled to form a breastwork in front of the stable walls, 3 feet thick and a double roof with bursting space of iron rails and sand bags was carried right along through the brick building. Three large curved iron "elephant dugouts," were fitted into the cutting. The roof of the elephant shelters was covered with a thickness of 2 feet 6 inches of earth above which a bursting space of one foot was left, and over this a bursting course—of railway iron—was placed. The next course was one of earth 18 inches deep topped by three layers of sandbags filled with broken bricks and to make all secure a final dressing with 2 feet of broken bricks. This monumental work was now safe against everything except 8 inch or larger shells and took 19 days to complete. Sleeping quarters for personnel were provided by driving a tunnel from the dressing room into the bank and excavating a chamber 24 feet by 6 feet which was heavily timbered and provided with bunks. Above the site of this excavation a bursting course made of heavy beams, iron rails, and chalk blocks was erected on the ground level, which work it was believed would make the sleeping quarters safe, at least, from 6 inch shells. All entrances to the A.D.S. were double gas proofed. It may now be realised how much importance our divisional medical officers attached to the protection of the forward posts and why it was that the elements of field fortification was imparted in the Anzac Medical Officers' Training School in 1916. A well sited and shell proof A.D.S. makes for two important considerations: advanced position and better work. Security for the wounded and their attendants are both essential, if satisfactory first aid is to be administered to the wounded at the earliest stage of their perilous journey of evacuation and a sense of security, however flimsy in its foundation, is of material help to a badly wounded man in removing apprehension of further damage, and as a prophylactic of nervous shock. The improvement of the protective work about R.A.P.'s was another matter at present receiving close attention, more especially the aid posts at the Sugar Factory in front of Colincamps on the Serre road. Enemy shelling was particularly severe both at Colincamps and at the factory corner where a brigade dump, always a centre of busy movement by day, attracted the attention of the German artillery. Arrangements had been completed for the establishment of a new aid post in this area, when on the 8th of May the R.A.P.

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was wrecked by a direct hit which killed the whole party in the dugout: Captain A. M. Tolhurst, N.Z.M.C., R.M.O. to the 4th Battalion, N.Z.R.B., the chaplain, the Rev. A. Allen, and one N.Z.M.C. orderly, were killed outright, the N.Z.M.C. runner being mortally wounded. A party of ours from the bearer relay post hurried over to the shattered R.A.P. and brought down the dead and the wounded man to the A.D.S. at Mailly-Maillet. Captain Tolhurst had many friends in the division which he had joined from the hospital ship *Maheno* late in 1917. He had been with his battalion since early in March.

North, in Flanders in the old familiar places about Armentières, Sailly, Ploegsteert, and Baillieul, the second German blow had been struck just as we had straightened our line on the Ancre. On the 9th, Ludendorf's birthday, and anniversary of the taking of Vimy in 1917, under the weight of densely packed German divisions, our defences melted away in front of Estaires. The Lys was crossed at Sailly and Bac St. Maur. Armentières was turned and our troops withdrawn, destroying the bridges as they passed. At Ploegsteert, some of the New Zealand Artillery the 2nd (Army) Brigade, N.Z.F.A. fought their guns in defence of the wood until their last few rounds, which were fired at point blank range into the houses in Ploegsteert village, while the 25th Division, who had fought with us at Messines were forced from hill 63 by the German torrents pouring down their wonted course, the Douve valley. New Zealand reinforcements, cyclists and cavalry gave a willing hand in the defences of Meteren—what time the 1st Australian Division was detraining at Hazebrouck—and later at Kemmel, when Messines had fallen. The story of the 4th Field Ambulance ends in this stormy period. On February the 7th, it ceased to be attached to the New Zealand Division and became the New Zealand Reinforcements Field Ambulance, a temporary unit, but it continued, under the same command, and with the same officers, to carry out its assigned duties at the A.D.S., École de Bienfaisence, at Ypres: later it was relieved and took over the Corps Scabies Hospital at Remy Siding. In March Lt.-Col. McLean, N.Z.M.C., left the unit to command No. 3 N.Z.G.H. at Codford and Captain Venables, M.C., N.Z.M.C., assumed his duties. At the end of March the remainder of the unit was attached to the 2nd Entrenching Battalion, the only portion of the 4th Brigade still left in the Fourth Army Area and in April, the remaining officers and personnel were drafted to the Division as reinforcements. There remained Captain Venables, M.C., now R.M.O. to the 2nd Entrenching Battalion; in this duty he was mortally wounded on the 8th May, and died in the 3rd Australian

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C.C.S. the following day. For over 19 months he had served with his original battalion, the 2nd Otagos; at the Somme, at Messines, where he won his decoration, and at Passchendaele. There was no more devoted R.M.O. in the New Zealand Division.

The British position on the Ancre had now become so secure and the diversion in the north had so relaxed the efforts of the Germans fronting us, that the whole complex routine of normal trench warfare was reestablished in the New Zealand Divisional Area. On our part: frequent raids and harassing bombardments—in the raids we had rather the better of it, nor were our casualties heavy. On the enemy's part, fierce burst of artillery fire, crashes, shell storms, lasting from two to three minutes in selected areas and an increasing use of shell gas bombardments. Gas drills and gas precautions were practised and strictly enforced; and very necessary they were because of the high concentration of poison vapour occasionally secured in small areas by projector fire in incredible profusion. In a neighbouring division no less than 2000 casualties due to gas poisoning were evacuated following a few hours concentrated gas bombardment; many serious cases and fatalities resulted. As our casualties during May were about 25 per cent. of those we sustained in April, the evacuation of small numbers of wounded daily, presented no problem of any magnitude. The A.D.S. at Sailly-au-Bois now well fortified, gave cover for some 100 stretcher cases; the greatest number of wounded handled in one day was on the 5th, when the New Zealand Division engaged in a minor operation with the 42nd Division north of Hebuterne.

The Third Army—which the New Zealanders found to be no less highly organised in technical administration than our much admired Second Army—early in May reopened its schools of instruction temporarily interrupted by the German invasion. Surgery, especially that of the front line, was a speciality of this Army, whose Consulting Surgeon, Col. H. M. Gray, was noted since 1916 for his work in the treatment of compound gunshot fractures. His memoranda issued by the Third Army in 1917, formed the basis of the front line surgical practice of this and other armies, and his well known book, "The Early Treatment of War Wounds," published at the end of 1918, epitomised the advancing knowledge of that period. His lectures given at Louvencourt were attended by all our medical officers in turn: the problems of shock prevention at the R.A.P. and A.D.S., the best method of splinting fractures and the demonstration of the regulation set of splints, now carried in racks by each motor ambulance, formed the basis of these lectures which were delivered over a sufficient period to enable all our

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medical officers to attend in turn. This method of instruction seemed preferable to the bimonthly conferences at a C.C.S. held by the Second Army during 1917. The new manual, "Injuries and Diseases of the War," (1918), was by now in the hands of all medical officers, so that all advances in war surgery and medicine were rapidly assimilated by the most forward medical units. At this time a compound serum, antitetanic, and, said to be, prophylactic against gas gangrene, was coming into use in the British armies; experimentally, at first, it was administered—on alternate days,—to the wounded who on the days when the gas serum was not used, received only the usual dosage of A.T.S. The treatment of wounded had now reached a very high ideal of perfection in the British Armies and our A.D.M.S. received during this period a very flattering commendation from the D.M.S. of the Third Army on the condition in which our wounded were reaching the C.C.S.'s. Had the laboratory succeeded in giving us a sure prophylatic against gas gangrene most of the danger from battle wounds would have vanished, but the serum was not to succeed in relieving us of the mutilating operations demanded by the necessity of guarding against gas infection. The organisms were multiple, and the virulence variable. A more encouraging departure in front line work, was the intravenous infusion of preserved blood reported on by Captain Walker of the C.A.M.C., late in June. In one of their raids the 2nd Canadian Division fitted up an advanced resuscitation room within one hour's portage of the front line. Both preserved blood and fresh citrated whole blood infusions were practised with the happiest results. The preserved blood corpuscles freed from serum and suspended in dextrin-saline solution could now be brought well forward and, as the report says, the soldiers talked with wonder of the cellars where "the dead men were brough to life by having blood pumped into them." Donors of blood, at this time, were granted three weeks leave. There was no dearth of volunteers.

Sanitation revived during the period of quiesence, sanitary sections having no control in forward areas, the preventive service of the Division was maintained by local sanitary officers appointed to areas. A course of instruction in water duties was opened at Louvencourt and at Hesdin the Army School of Cookery, previously in Albert, was visited by officers interested in interior economy, and was attended by cooks selected from the various units. The general health of the Division was very much the same as that of other units of the Third Army whose rate of wastage was nearly 10 per thousand per week, while the Division hardly exceeded 8 per

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thousand. But a very appreciable rise in the wastage curve was noticeable throughout the British Armies, the wastage from disease being now nearly double that of 1916, when the New Zealand Division first came to France. Trench fever was in great part responsible for the increase. P.U.O.—a term now meaning almost exclusively trench fever—was very prevalent, therefore the baths and the cleansing stations were much used. German prisoners taken about this time gave evidence by their cleanly appearance that on their side, there was no less devotion to antiparasitic measures, and when questioned, gave our officers to understand that their system of baths and laundries and arrangements for disinfestation were similar to ours. As typhus fever had been brought to the Western Front by German divisions coming from Russia, a very close watch was maintained by us on all prisoners of war as regards infestation. Serious as our sick wastage was at present, it was destined to be markedly aggravated by a pestilence of which the vanguard was at hand, the great influenza epidemic of 1918.

The month of May was one of intense expectancy and anxiety for the British Armies. The battles in Flanders and on the Somme had died down at the end of April. Messines and Baillieul were lost, but Bethune, Hazebrouck, Kemmel and Ypres we still held. Finding the gates ajar in Flanders Sixte Von Arnim had flung his whole weight upon them, so that his line now bulged into a very unhandy salient, south of Kemmel, and was much tormented by the Allied artillery. Both here and in front of Amiens the German reserve divisions had lost heavily, and the British Armies, given a few weeks respite, were already recovering from a condition of exhaustion as great as that of the Regular Army at the end of 1914. Doubt and uncertainty as to the point at which Ludendorf would next strike still tormented the British Higher Command. So far the hymn of hate had been set to marching time against the sole "fiend"—England—and there was every reason to apprehend a further onslaught against our enfeebled armies whose destruction Germany seemed solely to compass. But the gathering storm broke on the Chemin des Dames at the end of May, and if it did not fully expose the intention of our opponents, it seemed to promise at least a prolongation of the breathing time our forces so badly needed.

On 7th of June the New Zealand Division was relieved in front line by the 42nd Division, passed into reserve and for the next three weeks enjoyed a period of rest, but still in somewhat close proximity to the Corps front. The weather was fine and hot; the country about Doullens smiling, wooded and fruitful, and peaceful. Cricket matches, sports meetings, and the Kiwi Troupe of

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Pierrots entertained the men during the hours of recreation stolen from military training. Distinguished visitors came, the Prime Minister, the Hon. Mr. Massey, and Sir Joseph Ward, Minister of Finance, who visited various N.Z.M.C. units and formations, including the ambulances. Meanwhile the Divisional N.Z.M.C. supervised the corps rest stations at Authie and at Vauchelles where an aggregate of 300 to 400 British and New Zealand soldiers were under treatment.

Towards the end of the month an epidemic of unknown origin was spreading through the divisions of the Third Army and was already causing many casualties in the New Zealand Divisions. During the week ending June 29th, 1373 sick were admitted to the field ambulances, but beyond an increase of the numbers of cases of P.U.O. and influenza, there seemed to be no cause for alarm. The disease although severe for a few days was of short duration most men being able to resume duty in from 7 to 10 days time; many were treated by their own unit and were not even admitted to the field ambulance. The Third Army sick wastage rate was 10 per thousand during the last week in June; one British division in the Army had no less than 500 admissions to C.C.S. during this week; but the New Zealand Division, by establishing an isolation camp, kept its official wastage figures within reasonable bounds. This was the first wave of the great worldwide epidemics of 1918, and 1919, which originating in America in 1917 travelled from west to east, first breaking out in Spain in May, then spreading to all the armies of the B.E.F. in France in May and June. The first wave was not attended with much mortality, nor was it marked by any severity of complications, but by its high infectivity it disabled large numbers simultaneously, if temporarily. The name given to the disease in the western armies during the summer phase was "Three Day Influenza," and it was not treated as a notifiable disease. The maximum number under treatment in our division at the isolation camp at Marieux Wood was 1045 on July 3rd, but the figures dropped rapidly as the month advanced until in the early days of August the disease died out completely.

Thoroughly rested, the division, by the 7th of July, was taking over a new sector in the corps front between Hébuterne and Gommecourt, destined to be the jumping off place for their final victorious battles in the autumn.

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ARRANGEMENT OF THE A.D.S. IN 1918.

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Arrangement of an A.D.S. in 1918.

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CHAPTER XVIII.

Bapaume.

Prior to the British counter attacks of August, 1918, there was a six weeks period of semi-open trench warfare on the front held by the IVth Corps. On July 3rd, the New Zealand Division took over a new sector of defence in a maze of trenches between Gommecourt and Hebuterne, and became the centre division of the IVth Corps with the 42nd Division on our right the 37th on our left. General Russell moved into Headquarters at Couin, two miles north of Bus en Artois; the troops were billeted about Bayencourt and Coigneaux. The local tactical situation was as yet a defensive one. Our line was held in great depth, with outpost positions so sited as to give mutual support and well in advance of the main position which was on the heights of Gommecourt Ridge facing south-east towards Puisieux-au-Mont.

Fine weather and roads but little damaged by shell fire made for ease of intercommunication behind our lines and greatly facilitated the medical arrangements. No. 3 Field Ambulance took over an A.D.S. at Fonquevillers behind Gommecourt with a tent subdivision stationed at Bayencourt, the two connected by a car post at La Haie Chateau—midway between—on a good road. The chain of forward medical posts in the right subsector was based upon a bearer relay called Bull's Hotel in dugouts at the western extremity of Hebuterne which served the R.A.P. "Peryman's Post," in Hebuterne, by wheeled stretchers or hand carriage. A track called by us Pipi track, operable by wheeled stretchers, led back over a distance of a mile and three-quarters to the car post at La Haie Chateau. In the left subsector there were two bearer relay posts, one, in Gommecourt to which Ford cars had access, and in front of it in an advanced bearer relay "Mathew" connecting up with the R.A.P. at Salmon Point about 1200 yards in front of Gommecourt. From "Mathew" a trench tramway was available but could not often be used on account of shell fire. Between Gommecourt and Hebuterne in a trench named Guiness by some bibulous division—whose trench names were variously representative of well known British liquors, rum, beer, gin, whisky and stout—the R.A.P. "Guiness's Post," was evacuated by "Stout" trench to the Gommecourt B.R.P.

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In such a labyrinth of trenches, the monstrous product of British and German industry expended during three years of underground warfare, there was little difficulty in finding suitable positions for R.A.P.'s

The network of defences in Gommecourt had served the Germans well in 1916, during the early days of the Somme offensive, as all our attacks failed to dislodge them from their positions, the most northern embraced by our lines of assault. After the first day the battle was broken off in this sector and it was not until Beaumont Hamel had been taken and the German retirement to the Hindenberg line had commenced in 1917, that we entered into the Gommecourt fortresses. The lines of evacuation for wounded from our new sector were secure but as our outposts advanced, and that fairly rapidly, the R.A.P.'s were soon left far behind, so that towards the end of the month it became necessary to advance them to a closer proximity to our extended positions.

The M.D.S. opened by the 1st Field Ambulance was at Souastre about three miles west of Fonquevillers. The A.D.M.S. in his medical arrangements had provided for the administration of A.T.S. and the recording of casualties to be carried out at the M.D.S. exclusively. The divisional rest station under the 2nd Field Ambulance, at first established in tents and huts at Couin, moved later to Authie mill where it became the corps rest station commanded by Lieut.-Col. Murray, D.S.O., and accommodating about 150 patients in all. The medical tactical scheme included the selection of alternative posts in rear of our stations and detailed instructions to medical officers as to the action to be taken in case of a retirement and as to the alternative routes of evacuation for wounded already determined.

The early part of the month was chiefly taken up in nursing the influenza patients in the Isolation Camp: in all some 4000 cases were treated there during the summer epidemic.

Meanwhile our outpost line, far from adopting a passive attitude, was aggressively pushing out into the labyrinth of trenches which formed part of the old German front system of 1916. Our left battalion occupied a salient about half a mile deep, a situation which was rectified on 9th July by the 3rd Brigade in a successful operation; the casualties treated at the A.D.S. were one officer and 40 O.R. But the number of wounded passing through our posts was below the average of the previous month and, had it not been for the constant trench fighting of the division, would have been unusually small. Hostile artillery fire

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appeared to be below normal and although the German outposts resisted vigorously enough at times, their policy was in the main a defensive one.

On the 15th a more important advance under barrage was made by the 3rd Brigade between Rossignol Wood and a point just in front of Hebuterne, known as "Fusileer" trench. Special preparations were made by the A.D.M.S. for this operation: the bearer relay at Bull's Hotel was strongly reinforced by bearers from No. 1 Field Ambulance and the car posts doubly manned. By arrangements with the officer commanding the Corps "shock centre" provision was made for the administration of preserved blood at the A.D.S. at Fonguevillers. The attack was wholly successful and carried our outposts much beyond the objectives originally traced. Our casualties were light: 3 officers, and 66 O.R., including 8 wounded Germans, passed through the M.D.S. during the day. The following morning the Germans counter-attacked but without effect: they lost 39 prisoners and 15 machine guns. We had singularly few casualties, the wounded coming down in very good condition on account of the satisfactory chains of evacuation and the intensely warm weather which did much to minimise shock.

The very day that we engaged in our modest trench offensive, the final German offensive in the Great War was being delivered against the French bastion at Rheims. It failed; and on the 17th Foch's winning campaigns opened with vigorous assaults on the Marne salient by three French Armies reinforced by United States and British Divisions. The 15th, 34th, 51st and the 62nd British Divisions under our old commander, General Godley of the XXIInd Corps, with the New Zealand Cyclist Battalion won honourable distinction in these battles which were to convert the German advance into a disastrous retreat.*

Already on our front there were suspicious signs of a German withdrawal: explosions heard on the 20th in Rossignol Wood seemed to indicate the blowing up of dugouts; other unusual movements in the enemy's lines were observed. As yet, the prospect of a German retirement on a large scale did not seem at all clear, but it was imperative to keep close observation on any local withdrawals; to which end, cooperating with the 42nd Division, we pushed on, meeting with some resistance. We had 76 casualties through the A.D.S. as the result of an advance of several hundred yards which penetrated the communication trenches in front of Hebuterne and in Rossignol Wood, now definitely abandoned by the Germans. The advanced party of the

* Colonel Begg still attached to the XXIInd Corps as D.D.M.S.

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317th Regiment of the 80th Division, United States Expeditionary Force joined us the same day and by August 4th, two stout battalions of Yankees with their machine guns were sharing our trenches. Colonel Rhoades of the United States Hospital Corps, divisional surgeon of the 80th Division, visited our medical posts and sent us 4 medical officers and 4 N.C.O.'s to be attached to the A.D.S. at Bayencourt for a period of instruction. Again on the 24th and 25th July we pushed our front line forward, gaining prisoners, machine guns and trench mortars, while the wounded tended in the M.D.S. numbered about 150 up to midnight on the 26th. These rapid advances, which were continued during the first weeks of August with little loss, necessitated a corresponding advance of the R.A.P.'s as they were now, in some instances, 1500 yards behind our front line, but they were not pushed forward until clear signs of a German withdrawal were evident.

The 8th of August 1918, is stated by Ludendorf in his Memoirs to have been the black day of the German armies, and on the evening of that day he realised that further offensive operations could not be undertaken by the Central Powers. The failures at Amiens, in Flanders, on the Marne, and at Rheims and the vigour and skill of the French counter-offensives had used up most of the German Reserves. The locking up of many good divisions in the Marne salient negatived the original plan of a resumption of the Flanders battle, and the surprise attack, south of the Somme, conducted by the Canadians, Australians and British Divisions with 400 tanks on the "Black" day was a victory of such magnitude as to be decisive and final in the Amiens battle. German morale was weakening, their effectives dwindling, while the Allies, daily growing stronger by the accretion of American Divisions, had already attained numerical superiority. To their greater numbers were added preponderance of artillery and a new weapon, the light tank, which was the most effectual counter to barbed wire entanglements. And foremost in the causes leading to a German débacle was the united command, the harmonious rhythm of the Allied attacks, making pressure at many points so timed as to harry the German reserves from one field to another, only to engage breathless in a lost encounter. It was already the twilight of the Gods—the great Valhalla of the Wotan, Siegfried, and Brunhilda lines was still untouched—but Foch had foretold its doom. Ludendorf frankly advised Peace negotiations, but Hindenberg, still hopeful, determined to shorten his line by falling back behind his steel and granite walls. The battle of the Roman roads

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east of Amiens had cleared the Paris railway, but brought our troops to the threshold of the old German lines of 1916 and in front was a wide crater area unsuitable for tank manoeuvres. General Foch desired the British Commander in Chief to clear the German salient south of the Somme so as to assist General Mangin in his operations against the left of the Aisne heights and the St. Gobain massif; but Field Marshal Haig, pursuing his own plans, determined to attack north of Bapaume in country favourable to the tanks, so as to turn the old battlefields of the Somme from the north-west above Bapaume. The success of this campaign would give effect to the desires of Foch; as Bapaume once held by us, the line of the Somme south of Péronne would be turned. And Haig's strategic aims were more ambitious still: he intended, if the preliminary battle of Bapaume succeeded, to storm the Wotan line in front of Arras and to turn the right of the Siegfried positions, whose southern extremity, the St. Gobain fortress defied Mangin in his efforts to envelope the Aisne heights.

The battle of Bapaume was the first great trial of strength of the rallied British Armies and is stated to have been the most anxious, critical and hard fighting battle in the whole war. Mangin had prepared the way by his turning movement of the 18th, 19th and 20th August between Compiegne and Soissons which was calculated to draw German reserves in his direction, but a powerful group of German Divisions, warned betimes of our intentions, stood ready to meet the British advance. The first objective of the Third Army was the Arras–Albert railway.

On the 19th the A.D.M.S. of the New Zealand Division received warning orders for the forthcoming attack. A conference of A.D.'sM.S. of the IVth Corps was held the same day at the office of the D.D.M.S. and when Col. McGavin returned to the Division he summoned his field ambulance commanders to confer. The whole IVth Corps, now consisting of five divisions by the recent addition of the 5th and 37th, would advance to the Ancre Valley from Achiet le Grand to Miraumont. General Russell's orders were for the 3rd New Zealand (Rifle) Brigade to attack through Puisieux au Mont to Beauregard on the road to Miraumont where our right would cooperate with the 42nd Division in capturing a high point known as the "Dovecote" and push our patrols as far as the river above Miraumont. To the north, passing through the 37th Division the 5th Division on our left and the 63rd Division continuing the line northwards, would press south-eastwards so narrowing the New Zealand front until

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the 5th Division and the 42nd junctioned, at which time our Division would be withdrawn into Corps reserve. The maximal advance of the New Zealanders would hardly exceed two and a half miles as this preliminary operation was strictly limited in its objectives. The anticipated casualties would not be heavy.

The medical arrangements made by the A.D.M.S. were these: No. 1 Field Ambulance at the M.D.S. in Souastre would continue its duties; No. 2 Field Ambulance at Couin with one officer and 150 Infantry attached as bearers would be in divisional reserve and would receive all sick but would evacuate such as would not be fit under 24 hours; No. 3 Field Ambulance, with headquarters at Bayencourt, would be responsible for forward evacuation. All the bearers of No. 1 Field Ambulance were at the disposal of Lieut.-Col. Hardie Neil. All the motor ambulances less two, with the whole of the horsed ambulance waggons of the Division under the Quartermaster of the 3rd Field Ambulance—Captain Finlayson, N.Z.M.C.—acting as Transport Regulating Officer, were available for evacuations and were to be parked at Souastre. Inter-communication would be maintained by detailing one N.Z.M.C. runner to each R.M.O. and posting motor cyclists at the M.D.S., the A.D.S. at Bayencourt and at "Perryman's Post," now an A.D.S. in Hebuterne, lately a bearer relay post. Telephones connected the A.D.M.S. with the M.D.S. and the dressing stations at Bayencourt and Fonquevillers but the latter was to be handed over to the 5th Division at two hours following zero time, when A.D.S.'s would be established in Gommecourt and at Bull's Hotel in Hebuterne. The car posts would be correspondingly advanced at the same time. The usual provisions for walking wounded were to be made by marking tracks and by installing separate refreshment and dressing accommodation for their reception, while the horsed ambulance waggons were available for their conveyance from the A.D.S.'s to the M.D.S. At the M.D.S. a four hourly report was to be furnished showing the numbers of wounded passed through and the usual returns were to be compiled. The M.A.C. would evacuate the M.D.S. only. These simple divisional arrangements form a contrast to the elaborate corps schemes of the battles of 1917, but we were approaching a period of open warfare in which divisional medical schemes would give greater scope for individuality and self-reliance.

On the night of the 20th/21st, the concentration of the 5th Division behind our lines and the mounting of our attack proceeded without hitch. The ambulance transport, by direction, did not concentrate until after dark as all movements by daylight

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had been strictly guarded so as not to attract the attention of enemy aircraft. The A.D.S. at Fonquevillers was handed over to the 5th Division that night instead of the following morning, as at first intended, and an A.D.S. was established in Gommecourt.

OPERATIONS AT BAPAUME, 21ST TO THE 31ST AUGUST, 1918.

These operations may be considered as comprising three phases: first, the advance to the Ancre on the 21st and 22nd; second phase, the envelopment of Bapaume and the withdrawal of its garrison, from the 24th to the 28th; third, the advance to the line Riencourt–Bancourt beyond Bapaume and the repulse of the German counter attack on August 31st. The operations of the 21st and 22nd were of a preparatory nature. Zero hour was at 4.55 a.m., the dawn was very misty, and observation was limited. By 6.50 a.m. the N.Z.R.B. had captured Puisieux and were reported to be within 200 yards of their objectives. They had taken many prisoners, their casualties were light. The mist cleared by 10 a.m. and shortly after that hour all the New Zealand objectives were attained. At this time the A.D.M.S. directed the A.D.S. to move forward to a large dugout "the Catacombs" in the chalk at a point midway between Hebuterne and Puisieux. The road adjacent was practicable for motor transport and there was but little shell fire, so that evacuations proceeded quite smoothly and there was no congestion at any point. The total New Zealand wounded admitted to the M.D.S. for the day was 46. In addition some 70 wounded from other divisions with 33 wounded Germans were brought in; making in all 150 for the day's operations. During the night the 42nd Division secured the Dovecote after determined fighting. This day was remarkable on the IVth Corps front in that three divisions, associated in Gallipoli, again fought side by side: the 42nd East Lancashire Division, which had relieved us at Helles, and the Royal Naval Division now the 63rd, which had been with us at Anzac.

The following day, the 22nd, was a quiet day very few wounded passed through the M.D.S., not exceeding a score from all sources; the main fighting was further north. The reserve bearers of the infantry detachment under Lieut.-Col. Murray went to harvesting, the medical posts remained *in situ* and no incident of medical importance was reported, save that orders were issued for the reopening of the D.R.S. at Authie Mill. This suggested two issues present in the mind of the D.D.M.S.: hard fighting ahead and limited advances. Warned that the New Zealand

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Division would, in all likelihood, take over the area held by the 63rd Division, the A.D.M.S., accompanied by Lieut.-Col. Hardie Neil, reconnoitered Bucquoy with a view to establishing an A.D.S. there, and a site at Essarts, two miles to the westward, was selected as suitable for a M.D.S.

The following day, the 23rd, the British battle array was opening out its flanks, the Third and the Fourth Armies were fighting on a 33 mile front from just south of Arras to our junction with the French south-east of Amiens. The New Zealand Division was still in Corps reserve and, beyond a short advance to the Ancre by elements of the 3rd Brigade, was not engaged. The junction between the divisions on the left and right had squeezed out our front line. The Australians recaptured Albert and Meaulte, while the Third Army made headway in the northern area of the battlefield. Sir Douglas Haig, encouraged by these successes, and now fully confident that the breaking point of German resistance had been reached, determined to push on with increasing violence and audacity.

During the night of the 23rd/24th the 1st and 2nd New Zealand Brigades were concentrating in front of Loupart Wood and Grevillers in the neighbourhood of Achiet le Petit. That night two parties of the 3rd Field Ambulance, under Major Goldstein, M.C., N.Z.M.C., and Major Johns, M.C., N.Z.M.C., moved into Bucquoy to form an A.D.S. The bearer subdivisions with one bearer subdivision of No. 1 Field Ambulance marched at midnight under Captain Hutson, N.Z.M.C. and concentrated near Achiet le Petit. The following medical arrangements had been made:—to each brigade headquarters 20 N.Z.M.C. bearers were attached, and to each R.M.O. one squad of 6 N.Z.M.C. bearers, with one runner, N.Z.M.C., to keep touch with the A.D.S. The forward evacuating officer was to push out a bearer relay shortly after the brigade advanced; the A.D.S. at Bucquoy was to be prepared to move forward as the situation demanded; the M.D.S. would open at Esarts at an early hour; empty returning supply lorries were to be used for evacuating the walking wounded.

At 1 a.m. on the 24th, battle orders were issued by the divisional staff for the advance of the 1st Brigade—with the 2nd in support—to Grevillers and Loupart Wood with the ultimate object, Bapaume. At 4.30 a.m. the 1st Brigade advanced and made satisfactory progress through the wood and the village site, but the division on our left, failing to get Biefvillers less than a mile to the north, our 2nd Wellington Battalion was

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ordered to take it, which it did, at about 10 a.m., by which time we had captured 200 prisoners and 2 field guns and our line was east of Loupart Wood and Grevillers.

The advance of the ambulance bearers under Captain Hutson, N.Z.M.C., began at 4 a.m. when the bearer subdivisions moved forward to a cutting in front of the railway line at a point where it crosses the road from Achiet le Petit to Grevillers. From this post, the "Railway B.R.P." squads of four bearers with wheeled stretchers were able to work forward along the road, of which the surface was uninjured, to the R.A.P.'s of the 1st Brigade about Grevillers. Ford cars were used as far as the Railway Post, the heavy cars had a loading station just in front of Achiet le Petit. By 7 o'clock wounded were coming in to the A.D.S. at Bucquoy. At the M.D.S. at Souastre, the walking wounded were loaded on to empty returning lorries and although there was some slight delay in getting sufficient M.A.C. cars in the afternoon, all stretcher cases were cleared without difficulty. In the afternoon the 2nd Field Ambulance in reserve was moved up to Souastre. There was no hitch in the evacuations which proceeded smoothly; up to 6 p.m. the wounded passed through totalled 16 officers, 252 O.R., of which 182 were from the New Zealand Division. A German regimental aid post was overrun just in front of Grevillers, here three German medical officers were taken and reached the A.D.S. during the day. By 6 p.m. our line was half a mile in front of Grevillers, just one mile from Bapaume. During the day we had captured 400 prisoners and several guns. The British line south of us was through Le Sars to Mametz. That night the A.D.M.S. issued orders for the M.D.S. to advance to Bucquoy while the A.D.S. was to open in Achiet le Petit.

On the 25th the 2nd Brigade had orders to advance through Avesnes to the high ground north of Bapaume and to seize a line to the east of the town on the Cambrai road. The objectives of the 1st Brigade were: to encircle Bapaume from the south, junctioning with our left Brigade when the town had been surrounded. At 5 a.m. both brigades were in movement, the 2nd Brigade met with severe resistance and by 10 a.m. had reached Monument Wood on the Bapaume Arras road. Here there was much fighting with heavy casualties, but 150 prisoners had been taken and the brigade was pushing on in a renewed assault in the late afternoon. South of Bapaume, and conforming to the movements of the division on their right, the 1st Brigade made little progress in spite of staunch fighting: the Transloy–Loupart

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system with strong points about Thilloy and Le Barque was opposing frontally the advance of the 63rd Division so that, hemmed in on the left by the Bapaume machine-gun nests and checked on its right, the 1st Brigade was definitely arrested. At 10 a.m. the A.D.S. opened at Achiet le Petit, and established car posts behind Grevillers while a B.R.P., to serve the 2nd Brigade, was pushed forward near Biefvillers in a sugar factory just one mile west of the Monument Wood. In the forenoon the A.D.M.S. had interviewed the three German medical officers at the A.D.S. One of them, it appeared, was a naval medical staff officer on a visit to the front. Our attack had advanced very rapidly the previous day and in the mist and confusion the party had been cut off. Another medical officer was the Stabsarzt of the 14th Bavarian Regiment whose R.A.P. we had overrun; the third, a Lieutenant, was an R.M.O. of the same regiment. The junior officer was detained at the A.D.S. at Achiet to help with the German wounded, some 40 or more of whom were brought in during the day.

About 2 p.m. Major Johns, M.C., had gone forward to inspect the car post near Grevillers. It was at a point on the road leading down to Grevillers where a trench line intersected the roadway. To the north a road branched off to Biefvillers not far away. Suddenly an artillery crash fell upon the post. A withering local shell storm. Captain Patterson, N.Z.M.C., who was coming up from our R.A.P. at Grevillers, saw the storm break, and hurrying on found that Major Johns had been killed instantly, and with him three N.Z.M.C. men, while three others were wounded, one mortally. So ended the life of our breezy correspondent of the Somme and Messines at no great distance from the 1916 battlefields he so ingenuously described. He had served his battalion with distinction and was equally successful and admired as a section commander in No. 3 Field Ambulance. Modest, reticent, but full of quiet courage, his loss was keenly felt by all his comrades; he was the last of our medical officers to be killed in action. That our casualties in medical officers were light, must be attributed to the care exercised by both A.D.'sM.S. in making provision for the protection of medical posts; a policy always adhered to by the Division. Our N.Z.M.C. casualties for this day were unusually heavy: 1 officer and 4 O.R. killed; 1 died of wounds; 9 wounded; 1 motor ambulance driver of the M.T.A.S.C., attached, killed.

The M.D.S. which opened in Bucquoy at 2 p.m., admitted 12 officers and 238 O.R. wounded of the New Zealand Division, and

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MAJOR NOEL JOHNS, M.C., N.Z.M.C.
Killed in Action 25/8/18.

A CAR POST.

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evacuated a grand total of nearly 500 casualties, which included the wounded of other formations and German wounded prisoners of war. The routine dosage of A.T.S. was modified by G.H.Q. instruction on this date. A study of recent severe cases of tetanus led to the belief that the usual injection of 1000 units was insufficient as a prophylactic and in consequence the ambulances had orders from the D.G.M.S. to increase the dose to 1500 units; the new procedure was to be experimental only for a period of three months.

During the day we had captured many prisoners and some guns and by nightfall our 2nd Brigade, steering a northward course about Bapaume—still strongly held by determined machine-gunners—had reached a point near Beugnatre, north, and to the eastward, while the 1st Brigade faced by an impasse was still due south of the town. The German Divisions had orders to hold up our advance at all costs so as to permit of an orderly withdrawal of their troops in the old Somme battlefield. Bapaume, the goal of our 1916 battles, was a central keep in a powerful organised zone of defences, the main trace of which facing south-west had been the original German positions of 1916, but now remodelled and presenting a firm bastion strongly reinforced by many Divisions.

For three days the battle raged about the broken walls of Bapaume, whose desperate resistance seemed to increase rather than diminish as the days dragged on. The greatest battle yet fought by Haig was fully developed by the 26th, when the First Army, breaking out from the Arras heights headed by Canadians and the Guards swept rapidly through their old battlefields of 1917, regaining at a bound all that had been surrendered in March and pushing onwards tore a six mile gap in the northern extension of the impregnable Seigfried zone. The Hindenberg wall of steel and granite was turned; the Germans must fall back, and that rapidly, towards the inner Cambrai defences. This was the decisive day in the contest which was to regain all that we had lost in March and give us a dominance in positions and in morale over our opponents, which must lead to their final overthrow.

Throughout the three days struggle, the close of which on the 28th saw the abandonment of Bapaume and its subsidiary defences, the IVth Corps maintained its dogged pressure on the tough German line. To the north the 5th Division and our Rifle Brigade made some headway but with heavy losses, the New Zealanders penetrating ultimately to the Cambrai railway line,

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just north of St. Aubin. But the Ligny-Thilloy defences and the town held out irresistibly until the last. No change in the medical dispositions was necessary with the exception of an extension of the car posts and bearer relays north of the town keeping step with the advances of the Rifle Brigade. A car route from Biefvillers through Bihucourt and Achiet le Grand was found to be the most advantageous and at no time was any difficulty experienced in clearing the R.A.P.'s in the vicinity of Monument Wood in the northern and Grevillers in the southern sector. It had rained hard all the night of the 25th, so that heavy mud retarded the progress of the bearers for a time, but a drying wind and fine sunshine on the 26th made for easier evacuations. The roads, especially along the new route were in good condition and uninjured by shell fire. An entraining post for walking wounded was established at Puisieux au Mont, to which point our old 1917 light railway had penetrated, and now rapidly repaired, it was used to bring up ammunition, and the empty trucks returning taking the lightly wounded did much to relieve the M.A.C. cars and lorries. The total wounded treated on the 26th was, for the New Zealand Division, 13 officers, 255 O.R., and in all, 16 officers, 413 O.R. were evacuated from the M.D.S.

The Division undertook no offensive operations on the 27th or 28th, the dispositions remained the same; Bapaume was to be enveloped, not assaulted at great cost frontally. Our heavy guns rained shells all day into the doomed town and our defensive positions were improved to meet a sortie by the reinforced garrison, or a counter attack by divisions coming to raise the seige. Most of the wounded brought in during the early hours of the morning of the 27th, casualties of the previous day's fighting, were evacuated prior to 6 a.m., the total for the division being 11 officers, 250 O.R. In all over 300, but the numbers evacuated as a result of losses sustanied on the 27th, 28th and 29th, did not exceed 150. Enemy shelling was much increased on the last two days, our car post at Biefvillers was again affected, two men were wounded and two large cars had their bodies blown clean off. As the shelling subsided on the night of the 28th, a strange silence fell upon Bapaume—away to the eastward was seen the glare of burning dumps, and just before dawn our patrols penetrated the town to find it abandoned. Immediately our line pushed forward, the Rifle Brigade early reaching the old sugar factory on the Cambrai road. the 1st Brigade temporarily checked at the road leading south-east from Bapaume to Beaulencourt.

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During the day the A.D.M.S. reconnoitred a post at Grevillers indicated by Lieut.-Col. Hardie Neil, as the most suitable site for the A.D.S. A good cellar in the ruined village with a large yard adjacent was selected and preparations made to make it ready for occupation. At Irles a convenient post for a M.D.S. was inspected and Lieut.-Col. Craig was instructed to send forward parties to construct the necessary protective works. That night General Russell, whose headquarters had now advanced to dugouts in front of Bucquoy, issued orders for a forward movement of the 1st and 3rd Brigades to Riencourt and Bancourt on a line due east from Bapaume: the advance under barrage was to commence at 5 a.m. and had as its most remote objectives Haplincourt where the 5th Division would be on our left at Beugny and the 42nd Division on our right at Villers-au-Flos; a total advance of three miles. Acting on these orders the A.D.M.S. made arrangements with his field ambulance commanders to advance their posts during the day—if our progress was satisfactory—to Grevillers and Irles; the field ambulance in reserve remaining in position.

The Rifle Brigade was in movement at 5 a.m. on the 30th. Closely following the barrage they cleared Fremicourt village by 6.30 taking many prisoners. The 2nd Auckland Battalion assembled in front of Bancourt but did not move with the barrage as the Division on our right could not advance at the hour appointed. During the period of assembly the Battalion headquarters were posted in a sunken track east of the Péronne road in rear of an intervening ridge which separated the Battalion from Bancourt. The enemy counter barrage fell heavily about this point and one large shell knocked out most of the headquarters party including the R.M.O., Captain Simcox, who was very seriously wounded. The Chaplain, the Rev. Dobson, assuming the duties of R.M.O., bound up the wounded and got them away safely to Grevillers. 2nd Auckland ultimately carried Bancourt although the village of Riencourt resisted the 42nd Division until nightfall. Our casualties were considerable. Lieut.-Col. Hardie Neil made a personal reconnaissance at 8 a.m. in the direction of Bancourt and at 1 o'clock the A.D.S. was advanced to Grevillers. Car routes through Bapaume, where the road surface was good, were used to clear the northern sector and bearers relays pushed out beyond Grevillers to the vicinity of the Peronne road. Great difficulty was experienced in removing the wounded from Bancourt owing to enfilade machine-gun fire from Riencourt until the latter village was taken by the 42nd Division. Shortly

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after midday, Lieut.-Col. Craig was ready to receive wounded at his M.D.S. in Irles; a long tunnel in the chalk afforded good cover for stretcher cases and, although his station became somewhat congested during the afternoon, it was finally cleared by M.A.C. at 7 p.m. The old site of the 29th British C.C.S. on the road from Grevillers to Bapaume, one of the many C.C.S. stations we were obliged to abandon in March, was inspected, found to be in serviceable condition, and was earmarked for medical purposes. 11 officers, 234 O.R. wounded, of the New Zealand Division passed through the medical posts during the day; the total evacuations were over 300.

At dawn on the last day of the month a heavy barrage fell upon our front line, two large German tanks advanced to our outposts and later the whole of our front was strongly counter-attacked by a Saxon Division. Some ground was at first yielded, but ultimately the position was restored; two disabled tanks lay in front of our outpost line and about 50 Saxon prisoners remained in our hands. The capture of Bapaume was now completed and our lines in front of it were secure. A car post was established early in the day in the buildings, used before the retreat by a British C.C.S., which were adjacent to the old sugar factory on the Bapaume–Cambrai road and about a mile westward of Fremicourt. The route of evacuation was now through Bapaume to Grevillers. The casualties passing through the M.D.S. numbered 10 officers, 235 O.R. New Zealanders, in all over 300 wounded were evacuated including 30 Germans. The light railway at Puisieux, now adapted to carrying lying cases, did much to expedite the journeys of the M.A.C. who were experiencing some little difficulty in linking up the C.C.S. at Doullens with the rapidly advancing Corps front, already ten miles beyond its point of departure.

Throughout this hard fought 10 days about Bapaume, no difficulties in the evacuation of wounded presented themselves; all went well, and with the utmost expedition, all wounded were cleared in good condition to C.C.S. The multiplicity of trenches, dugouts, and galleries in the chalk, the results mostly of German efforts in 1916, provided well protected posts for medical personnel, both the R.A.P.'s and bearer relay posts. Good roads and less severe shelling permitted a free use to be made of motor ambulance cars and without serious losses in transport. The A.D.M.S. in his report on this period, one of transition from position warfare to that of open engagements, comments on this aspect of ambulance transport work:—"The good condition of the

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roads in the reoccupied territory," he writes, "has enabled motor ambulances to be taken far forward with various manifest advantages: the wounded are brought down more rapidly to M.D.S. and C.C.S. so that surgical treatment is applied at the earliest moment, a factor which contributes to the saving of life or limb; bearers are economised and are not exhausted by long hard carries; medical personnel is saved from excessive casualties. A motor ambulance travels at least four times faster than bearers carrying by hand; only one driver and an orderly are required to transport four stretcher cases; one lying case requires a squad of four bearers who take four times as long as a car; in other words, it would take 16 bearers four times as long to evacuate four lying cases as it takes two men with a car. The exposure of personnel is, therefore, as 1: 32" On these grounds the A.D.M.S. was of opinion that cars had not, in the past, been pushed up as far forward as might have been done; and that economy of mechanical transport had been given undue weight in its relation to economy of personnel. In regard to the location of the M.D.S. the A.D.M.S. formed the opinion that this medical post should be brought well forward but just out of range of field artillery and say, 9,000 to 10,000 yards behind the front line, as the closer to the A.D.S. it is sited, the greater the saving in ambulance transport for forward work. He goes on to comment on the work at the A.D.S. and lays stress on the importance of having well trained nursing orderlies capable of dressing wounds efficiently under the direction of a medical officer, so expediting the clearance of wounded and preventing congestion. The wounded, he notes, come down in waves and unless rapidly dressed and passed on, there is grave danger of a large number of cases collecting—a disadvantage accentuated in cold or wet weather when covered accommodation is limited. The A.D.M.S. concludes his report by stating his views on field ambulance organisation: "The field ambulance organisation in its adaptability and in the variety of combinations of its elements leaves nothing to be desired. In any action involving large numbers of wounded and especially where long hard carries have to be undertaken, the bearer personnel is necessarily inadequate. This difficulty is easily overcome by obtaining Infantry to act as bearers, each squad being in charge of a trained N.Z.M.C. bearer. It is not recommended that the bearers in a field ambulance be increased in numbers, as in quiet sectors there would be no employment for them."

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A number of items of Ambulance equipment proved unnecessary or excessive in quantity had been recently handed in.* A collapsible field kitchen capable of cooking for 250 men presented to each ambulance by the New Zealand Red Cross Society had been found to be eminently satisfactory.† In further comment on these operations it is well to note that the numbers of bearers within the brigade areas and under the control of regimental medical officers was markedly increased: the regimental stretcher bearers were now 32 per battalion; 20 N.Z.M.C. bearers had been attached to each Brigade and one squad of six to each R.A.P. Having in view the fact that the Division, fighting on a two brigade front, had as a rule only four battalions in the front line, and that the strength of battalions while in action had been compulsorily reduced to 640, the total number of bayonets in the front line was much less than, say, at Messines or Passchendaele, and the strength of bearer parties immediately available close to the front line proportionately increased. With a two battalion front a combined R.A.P. is often feasible where stretcher bearers can be pooled and directed to the point of maximum losses. A further innovation of moment was the attachment, *before action* of Infantry detailed as bearers to the ambulance held in reserve: so increasing the total bearer personnel by over 100 per cent. The infantry bearer detachment furnished by the reserve Brigade, numbering 150 under an officer, were provided with red cross brassards, and were used forward of the A.D.S. under the guidance of N.Z.M.C. N.C.O.'s.

The casualties for the Division, from the 21st August to the 31st inclusive, are estimated to have been: 411 killed; 1848 wounded. The number of wounded of the New Zealand Division passing through the medical posts during this period was 80 officers, 1847 O.R.; and in all, the two ambulances engaged, dealt with over 2,500 wounded in eleven days; the heaviest day being the 25th, when 20 officers and 319 O.R. wounded of the New Zealand Division were safely evacuated; the grand total of wounded for that day being 482. About 250 German wounded are included in the gross total of the operations. The proportion of lying to sitting cases was 41 per cent. and 59 per cent. respectively.

Our losses by sickness during August averaged about 180 cases evacuated to base hospital per week, the strength of the Division over 18,200, making an average weekly loss of about 9 per 1000 per week, which corresponded to the average wastage

*Field Medical Panniers, 1; Field Surgical Panniers, 1; Field Fracture Box 3; Surgical Haversacks, 12; Medical Companions, 2.

†Waites' Collapsible Camp Cooker.

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of the Third Army. Diarrhoea was increasing and clinical dysentery was recognised in many instances towards the close of the month. All troops were supplied with water sterilizing tablets to be used in emergency if the supplies of authorised water failed. Throughout the fury of the battle the domestic life of the Division was but little deranged: some 150 patients were accommodated in the D.R.S., the total turnover being about 1500. There was a certain allotment of leave to Paris, the baths were available as far forward as Irles, where our Divisional Canteen opened to supply the wants of messes; and the Divisional Soda Water Factory, conforming to the movements of the troops, was advanced from Doullens to Couin.

The days of the 1st and 2nd September saw stubborn fighting in our advance beyond Bapaume, towards Haplincourt; some progress was made each day and we took many prisoners, but our casualties were not inconsiderable. On the evening of the 2nd our line lay in front of Haplincourt, the 2nd Brigade now holding the divisional front. On the 3rd, the German resistance seemed to weaken, fires behind his lines indicated retirement, our troops pushing on without severe opposition passed through Haplincourt and advanced to Bertincourt. At 5 p.m. the A.D.S. was moved into Bancourt and a car and relay post was advanced along the road leading to Bertincourt to the site of a feld lazaret recently occupied by the German medical corps. The M.D.S. opened in the buildings once used by the 29th C.C.S. near Grevillers and it was found that the huts although somewhat damaged by shell fire, were still quite serviceable.

Each day the Division made rapid progress, the German rear guards falling back hurriedly on the Cambrai defences, until about the 8th, increasing resistance on our front made it clear that the retirement was coming to an end, and that the approaches to the Hindenberg line were to be held in force and with determination. The divisional headquarters had reached Villers-au-Flos; the main body of the New Zealanders was in possession of reserve line trenches held by British troops in March, 1917, about Havrincourt and Metz-en Couture. In front was the Trescault spur and a trench system originally British, known as the African trenches. The 3rd Brigade had relieved the 2nd in front line and on the 8th received orders to advance up the Trescault ridge to occupy the African trenches in co-operation with the 17th Division, now part of the IVth Corps. From his office at Reincourt, about a mile south-east of the D.R.S. at the old sugar factory on the Bapaume–Cambrai road, the A.D.M.S.

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issued instructions to the field ambulances to open an A.D.S. at Ytres and a M.D.S. at Barastre, both to be ready for the reception of wounded at 4 p.m. the same day. At Barastre Lieut.-Col. Craig, with the 1st Field Ambulance, found excellent accommodation in Nissen huts with dugouts adjoining at a site originally prepared by a British field ambulance and later occupied by a German feld lazaret. The A.D.S. opened at Ytres opposite the church., Lieut.-Col. Hardie Neil in charge. A car post was established at Mill Farm on the south-western fringe of Havrincourt Wood, on the road from Metz to Ruyaulcourt. At the D.R.S. site near Bapaume close to the old sugar factory, a quantity of serviceable material had been abandoned by the Germans in their retirement: malthoid roofing, wire netting suitable for bunks, a pile of soft woodshavings with which to fill palliasses, and a variety of stores all of which proved most acceptable to Lieut.-Col. Murray and his 2nd Field Ambulance in reconditioning the old C.C.S. site as a D.R.S. Amongst the booty was a German horsed ambulance waggon now a trophy in the New Zealand War Museum.

The first assault on the Trescault spur was on the 9th September, the New Zealand Division being to the south of the village on the road to Gouzeaucourt, where the 3rd Brigade attained all objectives and took nearly 100 prisoners. A copious use of gas shells by the enemy had marked the last two days of his retirement and on this day there was very considerable gas bombardment of the forward areas. A total of 36 gassed patients was tended during the morning, many suffering from the effects of "blue cross" gas, Dichlor—arsene. The wounded of the 1st and 2nd N.Z.R.B. came in early to the A.D.S. at Ytres; the total wounded for the Division being 3 officers and 127 O.R.; only two battalions were concerned, whose combined R.A.P. was in the "Quotient" trench line just in front of Metz-eu-Couture, while the bearer relay posts were at Mill Farm and Neuville. In all, including wounded prisoners, 216 casualties cleared the M.D.S. en route for a C.C.S. at Colincamps. On the following day the 10th, the situation remained generally unchanged, although enemy counter attacks realised minor successes in the African system about Dead Man's Corner. There was heavy gas bombardment of the forward area, our losses from this source being 17. The forward chain of bearer posts was reorganised: from the R.A.P.'s in front of Metz and on the southern edge of Havrincourt wood, a first class road in good condition from Trescault village led into Metz. Just half a mile from the latter village on this road

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there was a wayside crucifix, here the roadway was sunken and provided dugouts for a bearer relay. Further north and east of Havrincourt Wood on the road to Trescault, a quarry 30 feet deep was utilised as an advanced bearer relay with overland route through the wood to the Crucifix, just under a mile back.

Meanwhile preparations were in hand for a more important assault on the recalcitrant Trescault spur and the African system, once the old British front line and the point of departure for a portion of our stormers in the surprise attack on Cambrai in November, 1917. Four miles to the north was Burlon Wood and the village of Moeuvres where the 56th Division—the Bow Bells our neighbours at Sailly in 1916—fought the German counter offensive on November, 30th, 1917. The 10th was a cold day and showers fell at intervals; a conference of the A.D.'sM.S. of the IVth Corps was held at Grevillers where the D.D.M.S. had established his office. The 56th C.C.S. had now been advanced to the old C.C.S. site on the road to Biefvillers, previously occupied by us as a M.D.S. The day was "quiet" on our front, the casualties numbered about 60, with a proportion of gassed much above the normal. The following day, the 11th, was spent in preparation for the second attack, which had been postponed 24 hours and was to take place on the morrow. The weather was cold, with intermittent showers. The A.D.M.S. held a conference of his field ambulance commanders at which the divisional orders for the assault, timed for 5.25 a.m. were discussed. With the 38th Division on the right and the 37th on the left, the New Zealand Division was to form the centre of the Corps front and would have three battalions of the 3rd Brigade in the front line. Under a strong barrage furnished by our own and additional batteries of the divisions in Corps reserve the assaulting waves had as final objectives the African system at the top of the ridge dominating Gouzeaucourt and the railway from Cambrai to Peronne less than three miles from the Hindenberg line. The medical arrangements made were these:—No. 3 Field Ambulance with the bearer sections of No. 1 Field Ambulance and a detail of 50 infantrymen attached as stretcher bearers was to evacuate the forward areas to the main car post at Mill Farm, thence to the A.D.S. at Ytres. The most forward R.A.P.'s were in a sunken road leading up towards Dead Man's Corner, a road junction on the top of the ridge about three quarters of a mile eastward. From the sunken road the route was by hand to the Crucifix Corner, just a quarter of a mile out of Metz on the road

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to Trescault; in this neighbourhood the road was also sunken and had many dugouts in its cuttings. The R.A.P.'s about 1200 yards east of this point were supplied with N.Z.M.C. squads and wheeled stretchers as the road surface was quite satisfactory and it was hoped that light cars could reach the Crucifix post. The route then lay through Metz to Mill Farm where heavy cars would have rendezvous. The Havrincourt Wood was on its western edges still leafy and afforded concealment, but no roads practicable for ambulance transport ran east and west except a planked road used by the artillery and unsuitable for the evacuation of wounded. There was considerable shell fire about Metz and that portion of the wood which lay north of it, but as yet the roads were operable and the best route of evacuation by cars lay through the ruins of the village. An alternative car post was sited on the extreme western edge of the village to which carriage by hand could be adopted in case the village route proved impassable. At the M.D.S. at Barastre preparations were made to receive a large number of wounded. Extra horsed ambulance waggons were provided by the resting division to be employed in conveying the walking wounded to the entraining point at Bihucourt, where the main line, Arras–Albert–Amiens was tapped by the Cambrai–Bapaume branch. The 21st M.A.C. stationed at Le Barque detached four motor ambulance cars and a motor cyclist to each of the divisional M.D.S.'s so that lying cases could be cleared in a continuous stream and without delay, to the 56th C.C.S. at Grevillers.

Zero hour was at 5.30 a.m., there was heavy fighting. Our left battalion in touch with the 37th Division, early attained the final objective, but resistance increased from the centre to our right, where touch was not obtained with the sister division. Confused fighting in a complex trench system followed and was accidented by strong bombing attacks by the Jägers, which drove in our line—especially bitter the struggle about Dead Man's Corner. The first walking wounded arrived at 6.25 a.m. at Mill Farm about two and a half miles from the front line. They reported the barrage to be "lovely" and all going well. The first lying case was carried down by hand by German prisoners; some time later, Ford cars were able to get up as far as Crucifix Corner. Owing to heavy shelling by high velocity guns the A.D.S. was moved back from Neuville to Ytres, at least for lying cases, but a small staff remained on at the former post to collect walking wounded. The R.A.P.'s were clear by 11 a.m.; there were few casualties on our right near Gonzeaucourt Wood: wounded from

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this area were chiefly Germans and men of the 37th Division. By midday about 180 wounded had cleared the M.D.S. Horsed ambulance waggons, char-a-bancs, and lorries were used to convey the walking wounded to Bihucourt over seven miles back from Barastre. By 6 p.m. the total casualties cleared was 12 officers, 256 O.R. including German wounded. During the afternoon the D.M.S. Fourth Army, Major General Sir T. M. Irwin, visited the M.D.S. where evacuations were proceeding smoothly and without any congestion. In the evening about 8 o'clock, during a fierce counter attack, there was heavy shelling about the R.A.P.'s and the Crucifix Corner, both gas and high explosive being used. One N.Z.M.C. stretcher bearer and eight German prisoners who were assisting with the wounded were killed and 13 N.Z.M.C. were gassed later during the night. The gas was not detected, being in low concentration. Most of the bearers affected were in dugouts, some 12 feet below the road level but the whole area was polluted and a six hour exposure to the diluted gas had cumulative effects which compelled evacuation. It had rained most of the day, the humid air increased the persistence of the poison vapour. Many gassed men passed through during the night, bringing the total casualties to 363 wounded or gassed, including 79 German wounded.

The struggle with bomb and bayonet continued during the 13th and 14th, and culminated with a fierce counter attack at night by the Jägers headed by flame throwers, which did not wholly re-establish their line, although we lost some ground. There was increased shell fire on all roads forward of Mill Farm but light cars still penetrated as far as the Crucifix. No alteration in medical dispositions were made, the wounded evacuated being over 160 each day with increasing numbers of gassed. Night bombing, the terror of the moonlight, was severe in the back areas, about the A.D.S. especially, and although there were many casualties in the neighbourhood none actually in the N.Z.M.C. parties. But those who, on the night of the 13th, saw two German bombing planes blazing a fearful cometlike trail through the dark as they crashed to their doom, forgot to rejoice.

Relief was at hand, and, on the 15th, the 5th Division took over our sector. Parties from the 13th and 14th Field Ambulances infiltrated our medical posts, and the Division went into rest after four weeks almost continuous fighting, the divisional headquarters at Favreuil, the ambulances about Bihucourt and Biefvillers.

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CHAPTER XIX.

The Final Campaign on the Western Front.

The victorious campaign of the Allied Armies which opened in the last days of September, 1918, comprised the greatest battles recorded in History. Seven nations in arms contested the western field with millions of skilled fighters possessed of weapons and engines of destruction which even at the outset of the Great War were unknown and undreamed of. The objective of this world clash was the immediate and utter destruction of the field forces of the Germanic League. Heretofore no such operations planned to end the war by a succession of rapidly falling strokes had been possible; equality in means and will to fight made the contestants so evenly matched that for years there could could be no decision. But now, in the autumn of the fifth year of the war, conditions on the western front were changed; the breaking down of the German Armies, aggravated by their fruitless offensive in the summer, had been made manifest by the Entente successes in August and early September. The united Allied Command could now at long last, previse the speedy overthrow of their opponents and, with all confidence possible in warlike ventures, hope for decisive results from their well matured and skilfully devised scheme of operations.

The central idea in this great strategic concept was the seizure of that knot of railway communications which is included in the triangle Valenciennes–Maubeuge–Mons, into which the British Expeditionary Force had been hurried in 1914, and once driven out, had ever since striven to regain. It was the central ganglion of the German communications that controlled the maintenance of their armies in France from Lille to Metz. Such a stroke, if successful, would end the war by breaking the military power of Germany and that instantly. The position of the German Armies in France was indeed critical: added to the losses in men and material which they had sustained during their six months summer offensive, was the manifest loss of morale caused by the knowledge that the Entente Powers were waxing daily in strength by the reinforcement of American Divisions. The collapse

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of the Balkan and Palestine fronts, which was brought about by the surrender of the Bulgars and the ruin of the Turkish Armies, and the avowed exhaustion of Austria, were catastrophies of the gravest moment to the German Higher Command. Above all the smashing of the Drocourt–Queant or Wotan line by tanks early in September and the consequent turning of the Siegfried zone from the north made it ominously clear that the Hindenberg defences in front of Cambrai were not impregnable; nor would they even hold out against determined assaults for so long a period as was necessary for an orderly retirement.

The task elected by Sir Douglas Haig for his central Armies in the final campaign was the old time-worn British endeavour: to get back to Mons, which objective Ludendorf says was at the root of all British offensives since 1915. The German Valhalla, the Siegfried field fortresses, although turned from the north, still barred the way to Cambrai on the front of the Third and Fourth Armies. Constructed at leisure and so sited as to give the maximum defensive advantages on ground already strong by reason of its physical configuration, the seven mile deep zone of steel and concrete was originally designed to give a temporary respite to the German armies reeling back from the Somme battlefield in 1916, and so to shorten the German front as to enable the formation of new reserves by the manning of incredibly strong positions with weak divisions. Ten miles of country was laid waste in front of the Hindenberg line, the wells, the roads, the villages, all were destroyed during the German ordered retirement of March, 1917, and so inadequate were the communications available to the British and French who followed, as to forbid indefinitely the mounting of further attacks. Like the positions of Torres Vedras or the earthworks thrown up by Maréchal Villars between Arras and the Somme, which saved France from Marlborough's invasion in 1710, the Siegfried lines were originally only a temporary halting place for the gathering of fresh momentum; but now they had become vital to the safety of the German Armies; they were indeed the last ditches of a forlorn resistance. Confronting these heroic retrenchments and their determined defenders, the British Armies much reduced in strength and wearied by months of hard fighting, although inferior in numbers and divisions, yet were composed of veteran fighters and commanded a greatly superior war equipment. Our tanks could overrun almost any obstacles, clearing a pathway for the Infantry through a jungle of barbed wire in a fraction of the time previously demanded by heavy artillery; a factor making

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for surprise,—above all, our troops were heartened by their recent successes and were confident that the defeat of their opponents was at hand. They had achieved and realised a great moral superiority.

The final campaign opened on the 26th September in the Argonne to the west of the Meuse, where powerful American and French Armies attacked towards Mezières on a wide front. On the 27th Haig's First and Third Armies broke through the Hindenberg line on the Canal du Nord at Moeuvres, gaining the east bank of the canal and extending their front from the Sensée innundations to Burlon Wood. On the 28th the battle line included Gouzeaucourt; 10,000 prisoners and 200 guns had been taken and the left shoulder of the British battle front was brought up level with the right. The Fourth Army struck on the 29th and the whole British front from St. Quentin to the Sensée was ablaze. In Flanders the King of the Belgians was leading his Armies up the road to Passchendaele, and directing Plummer's Second Army towards Messines, Ploegsteert Wood and Armentières. Everywhere on the Allied fronts from Baghdad to Dixmude the Entente forces were advancing. By the 1st of October New Zealand machine-gunners were entering Damascus, the Serbian Army was on the banks of the Danube; the Hindenberg line was broken; while at Spa, in the Ardennes, Ludendorf was solemnly announcing to his War Lord that the end had come and that Germany must sue for peace—and that instantly.

The principal events in the Battle of St. Quentin–Cambrai in which the New Zealand Division was concerned comprise the passage of the Hindenberg line at Welsh Ridge and Bonavis spur on the 29th of September; the advance to the Scheldt Canal south of Cambrai on the 30th; the establishment of a bridge head at Crèvecoeur on the 1st October; and the final passage of the canal on the 5th.

During the short rest period close attention had been directed to anti-gas training as the daily harassing fire with blue and yellow cross gases had materially increased the casualties in the IVth Corps, from which, in one week, no less than 188 gassed casualties had been evacuated to C.C.S. Artillery units were chiefly affected, and in most instances, owing to the men continuing to work in areas where low concentrations of gas persisted. Lectures and gas drills were given daily to all units and particular care was devoted to the gas training of the ambulance personnel, who were very liable to suffer from want of attention to necessary precautions. The equipment of the field

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ambulances was revised and renewed, and the motor ambulance cars were fitted with the exhaust heating apparatus in use during the winter months. The D.R.S., near the old sugar factory about a mile from Bapaume Station on the Cambrai road, had been in turn the site of a C.C.S., and later a German feld lazaret, and during the occupancy of the 2nd Field Ambulance it had been reconstructed so as to provide good accommodation for 150 patients in huts and tents protected by low walls against aeroplane bombs. Large cellars in the sugar factory were available and occasionally were required as there was some shelling by long range naval guns in the vicinity, happily without casualties to the patients or personnel. A lecture by Colonel Pilcher, C.B., consulting surgeon to the Third Army, given at the D.R.S. was attended by all medical officers. The methods recommended for first aid to the compound fractures of the humerus and femur were discussed, especial stress being laid on the advantages of slight flexion of the knee in the thigh cases, and the use of "Tapson" heel clips for counter extension. The treatment of shock by seven per cent. gum saline solution was also dealt with and the advantages of using sphagnum moss for dressings and pads were emphasised, not only on account of the saving of cotton wool, of which there was a scarcity, but because of the suitability of the substitute. Several medical officers were attached for duty at the C.C.S.'s, others were employed at the corps walking wounded post at Bihucourt. The rest period did a great deal of good: the sick wastage rate which had been as high as 12 per 1000 in the middle of September, fell to 8 per 1000 towards the end of the month.

On the 26th orders were issued for the concentration of the Division in the Havrincourt area, and at 6 p.m. the same day the 2nd Brigade group accompanied by the 1st Field Ambulance were on the march. During the day a conference of field ambulance commanders was held at the A.D.M.S.'s office. It had been arranged that No. 1 Field Ambulance under Lieut.-Col. Craig should take over the duties of forward evacuations and man the A.D.S. in the forthcoming operations, and that Lieut.-Col. Murray, D.S.O., should hand over the D.R.S. to Lieut.-Col. Hardie Neil, and assume the duties of the M.D.S. On the 27th the 2nd Brigade was still moving up by lorries to the vicinity of Bertincourt. The IVth Corps was attacking with the 42nd Division on the following day. The A.D.M.S. inspected the 2nd Field Ambulance in marching order, and the advance parties of No. 2 and No. 3 Field Ambulances were on the move. In the evening No. 1 Field

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Ambulance opened a temporary A.D.S. at Neuville, and sent runners and squads of bearers to each of the R.M.O.'s of the two brigades. The 1st Brigade with the 2nd Field Ambulance were moving up to Ytres on the 28th. Advanced Headquarters opened this day at Trescault and issued orders for the forthcoming battle to be engaged at 3.30 on the following morning. The New Zealand Division was to pass through the 42nd Division to advance to the Canal de St. Quentin between Crèvecoeur and Vaucelles and seize the eastern banks of the Canal and Scheldt river, which ran parallel in the valley south of Cambrai.

During the day Colonel McGavin had reconnoitred Trescault with Lieut.-Col. Craig and it was decided to establish the A.D.S. in the ruins of the village whence somewhat damaged roads led forward to Ribecourt and Villers Pluich in the direction of the advance of the attacking brigades. A dense network of trenches, part of the main Hindenberg line, ran diagonally through the divisional front from Laffaux Wood towards Ribecourt and Trescault. At Ruyaulcourt a site for the M.D.S. had been visited by Lieut.-Col. Murray and the A.D.M.S., and the 42nd Divisional Ambulance parties there were to hand over to our No. 2 Field Ambulance that evening. It had rained during the day, the weather was cold and the sky overcast, but the rolling character of the terrain suggested little danger of mud interfering with the evacuations. All available transport and personnel were now sent forward to Trescault providing Lieut.-Col. Craig with 106 extra N.Z.M.C. bearers, four small and six large ambulance cars in addition to his own transport, besides some horsed ambulance waggons. That evening the A.D.M.S. wrote the medical corps orders, which follow, and which are reproduced in full because they represent what may be considered to be typical divisional medical orders of this important period and because of their brevity so markedly in contrast to the very voluminous medical arrangementst of the years of static warfare.

COPY.

SECRET Copy No. 11

NEW ZEALAND DIVISION.

Headquarters, 28th Sept., 1918.

N.Z.M.C. ORDER NO. 71

by

COLONEL D. J. MCGAVIN, D.S.O., A.D.M.S. NEW ZEALAND DIVISION.

Reference Map:— 57.D: 1: 40,000.

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1. INFORMATION.

(A) On the night September 28th/29th the New Zealand Division will pass through the 42nd Division and continue the advance:

(a) To complete the capture of the Bonavis Ridge;

(b) To secure the bridgeheads across the Canal de St. Quentin and Escault River between Vaucelles and Crevecoeur sur L'Escault, both inclusive.

(B) In the event of La Vacquerie and the Bonavis Ridge being in the enemy's possession, the 2nd New Zealand Infantry Brigade (on right) and 1st New Zealand Infantry Brigade (on left) will attack in conjunction with the 5th Division on that night by moonlight.

Zero Hour will be 3.30 a.m.

(C) The 3rd (Rifle) Brigade Group will be prepared to move at 6 a.m. on September 29th to relieve reserve brigades of 42nd Division in an area east of Trescault.

2. O.C. No. 1 New Zealand Field Ambulance will:

(a) Establish advanced dressing station at Trescault forthwith;

(b) Detail one bearer squad and runner to each battalion of 1st and 2nd New Zealand Infantry Brigades forthwith;

(c) Place bearer relay posts and car posts at suitable locations with reference to regimental aid posts when these are established.

3. O.C. No. 2 New Zealand Field Ambulance will take over the main dressing station at Ruyaulcourt from 42nd Division forthwith.

4. Evacuations of wounded from R.A.P.'s to M.D.S. will be by hand carriage, wheeled stretchers and field ambulance cars.

O.C. No. 1 New Zealand Field Ambulance will have at his disposal all cars of No. 2 New Zealand Field Ambulance and all except two large cars of No. 3 New Zealand Field Ambulance. These cars will be sent forward to Trescault by O's.C. Nos. 2 and 3 New Zealand Field Ambulance forthwith. He will also have at his disposal the horsed ambulance waggons of Nos. 2 and 3 New Zealand Field Ambulance.

5. From main dressing station stretcher cases will be evacuated by cars of 21st M.A.C. and walking cases by:

(a) Light railway from walking wounded entraining post at Ruyaulcourt (P.9.d.8.2.);

(b) by busses and lorries provided by 21st M.A.C.

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6. The A.D.S. will be established and be prepared to open at 5 a.m. on 29th September.
7. Office of A.D.M.S. will open at Velu on 29th September at an hour to be notified later.
8. New Zealand Field Ambulances to Acknowledge.

(Sgd.) D. McGAVIN, Colonel, A.D.M.S.,
New Zealand Division.

Distribution: (9.30 p.m.):—

1. D.D.M.S., IVth Corps.
2. "G" New Zealand Division.
3. "A" and "Q" New Zealand Division.
4. O.C. No. 1 New Zealand Field Ambulance.
5. O.C. No. 2 New Zealand Field Ambulance.
6. O.C. No. 3 New Zealand Field Ambulance.
7. A.D.M.S. 42nd Division.
8–10. War Diary.
11. File.
12. Headquarters. 1st New Zealand Infantry Brigade.
13. Headquarters. 2nd New Zealand Infantry Brigade.
14. Headquarters. 3rd New Zealand (R) Brigade

No. 1 Field Ambulance on receipt of these orders moved into Trescault and despatched N.Z.M.C. runners and bearers to the 1st Brigade. Both brigade headquarters were near Ribecourt, two miles further north on the road to Marcoing. By some strange accident to the motor cyclist Lieut.-Col Murray did not get his orders until 1.30 a.m. on the 29th, he was then at Bus, west of Ytres but by 3 a.m. he had opened at Ruyaulcourt in some Nissen huts and farm buildings previously used by the 42nd Division as a main dressing station.

At 3.30 a.m. in moonlight, our Infantry battalions advanced across the Couillet Valley and in conjunction with the 5th Division on the right and the 62nd on their left, attacked the Bon Avis Ridge and La Vacherie at daybreak. By 9 o'clock the ridge was firmly held and our patrols were pushing down to the canal banks; our losses were not heavy. The wounded of our own and neighbouring divisions and German wounded were passing through Trescault A.D.S. early in the morning, but the first waves did not reach the M.D.S. at Ruyaulcourt until 8 a.m. The delay was due in part to the distance—four miles to the A.D.S., but mainly to the bad conditions of the forward roads from Metz-en-couture to Ribecourt. There was no difficulty however, in evacuating; car posts were pushed forward towards

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Ribecourt and the neighbourhood of Beauchamp and the bearer relay posts forward, found ample cover in the innumerable trenches leading across the Couillet Valley. By 2 p.m. 151 wounded had been admitted to the M.D.S., of these 65 lying. The wounds were chiefly due to machine-gun fire; there was a considerable number of German wounded on stretchers. At 6 p.m. the wounded of the New Zealand Division evacuated amounted to 11 officers, 154 O.R., and the total treated was 19 and 289, including Germans. 8 M.A.C. cars attached to the M.D.S. kept it clear; the walking wounded were evacuated by lorries to the light railway embarkation point, where a section of the New Zealand Y.M.C.A. provided refreshments and minor comforts.

The weather had been fine all day but rain came on in the evening and continued throughout almost the whole of the night. Owing to persistent shelling in Trescault the A.D.S. was advanced at 7 p.m. to a sunken road half way between Trescault and Ribecourt where a car post had been established earlier in the day. The main German trenches crossed the road at this point affording cover and shelter in the deep dugouts which were plentiful. Apart from this move and some slight delay in clearing stretcher cases from Trescault the evacuations proceeded smoothly. Up to 10 p.m. another 100 wounded had reached the M.D.S but during the remainder of the night few wounded came in. The day had been a successful one, much ground had been gained and well over 1000 prisoners taken. During the night the orders were to continue the advance, but it rained incessantly until 2 a.m. and the night was very dark. The enemy held the eastern bank of the canal and river, and appeared to be increasing his numbers. Our further advance was consequently delayed until daylight. According to Corps information the Germans were retiring to eastwards of the water ways and the chief opposition, it was anticipated, would be met with in the passage of the Canal. This information must have been accurate else the brigades could not have penetrated the trench zone with such apparent ease and at so slight a cost.

Rain ceased at 2 a.m. on the 30th, and two hours later the enemy artillery fire fell upon the assembly points of our infantry who just before daylight were advancing against Crèvecoeur and Vaucelles. Small parties penetrated across the stone bridge at Crèvecoeur but beyond this no further progress was made that day. The ground had dried up during the morning; the evacuation of the wounded presented no difficulties. A car post was established in the Couillet Valley, at the junction of the roads

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leading south from Ribecourt and Marcoing, about two miles south of the latter village; the route to the A.D.S. running through Villers–Plouich and Beaucamp. Close touch was maintained with the R.A.P.'s by a bearer relay in the German trenches further east. There was no dearth of bearers as the O.C. No. 1 Field Ambulance was able to maintain a reserve of 40 bearers at the A.D.S. including a party of 20 prisoners attached for stretcher bearing. At the M.D.S. over 200 wounded passed through; it seemed a quiet day. Rain fell again at 9 p.m. but the night passed without incident, few wounded coming in to the dressing stations.

At 5.30 a.m. on the first of October, the 1st and 2nd Brigades were pushing on in their attempt to cross the Canal. Part of the 1st Brigade passed the water ways by the bridges at Les Rues Vertes and emerging from the village of Masnières made a bold stroke for the northern outskirts of Crèvecoeur. Rumilly to the north was still in German hands, the 3rd Division were attacking there. By 8 a.m. the 2nd Wellington Battalion had joined hands with the 2nd Brigade in Crèvecoeur, but the 1st Auckland Battalion to the north met with stubborn resistance about the road to Cambrai and pushing on beyond with considerable losses were met by a strong counter attack from Serainvillers which drove them back to the Cambrai road at a point where it passed through a cutting just about half a mile north of Crèvecoeur. A wayside crucifix looked down on the road at this point which became a calvary for many of the Aucklanders. After 11 a.m. a car post had been pushed forward to the south of Rue Vertes at the junction with the Marcoing road. At 1 p.m. a message from the 1st Brigade reached the A.D.M.S.

"Namo casualties estimated 60 O.R. R.M.O. unable to cope with situation can DERI send doctor and strong stretcher squads to mon Plaisir Farm G 27d.9.7. to assist and cars to cross roads G 32 b.oo.7o aaa addsd FETU reptd DERI (signed) HUNI 1300."

This obscure missive was quite clear print to the A.D.M.S. whose code name was DERI and explained that HUNI, the 1st Brigade, wanted help at a farm just a mile east of Masnières on the road to Crèvecoeur where casualties of the 1st Auckland Battalion had accumulated. Captain Ardagh, M.C., N.Z.M.C., had moved his medical detachment across the canal about 10 a.m. and pushing on in rear of his battalion established his aid post at a farm curiously named "Mon Plaisir." The heavy fighting about the crucifix brought down a large wave of wounded to

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this very exposed position which was subjected to a constant and severe bombardment during the afternoon. There was no protection in the farm buildings which were in clear view of the Germans occupying the rising ground above Crèvecoeur only a mile and a half to the eastward. Much difficulty was experienced in clearing the post. Up to 6 p.m. 33 stretcher cases and 63 walking wounded had cleared the M.D.S., and a further 42 stretcher cases with 90 sitting, up to 10 p.m., at which time the A.D.S. reported all aid posts cleared and provided with necessaries and the A.D.S. clear save for 20 stretcher cases being loaded at the moment.

At 10 p.m. Rumilly was reported to be occupied by the 3rd Division and on receipt of this information the A.D.M.S. issued instruction for the M.D.S. to move forward to Ribecourt and for the A.D.S. to be advanced to Rues Vertes to positions which he had reconnoitred during the day. It had been a day of hard fighting, over 1000 prisoners had been taken. We had succeeded in making a secure lodgment in Crèvecoeur; but towards Vaucelles no advance was made beyond the Canal line—the Beaurevoir–Masnières defensive system, heavily wired, was still intact south of Crèvecoeur.

It rained hard during the night but all wounded were safely in, and a fine clear morning followed. The New Zealand Division found its line thrust eastwards into a sharp salient about Crèvecoeur so that no further advance on our part was desirable until the supporting divisions made progress on our right and left. At 10 a.m. the M.D.S. opened at the southern end of Ribecourt village in farm buildings much battered by shell fire. A party of 50 New Zealand Pioneers under an officer was attached for the purpose of clearing the rooms of debris and making roads through the large farmyard which was littered with broken material fallen from the damaged barns. The A.D.S. was in a quarry by the side of the road just at the southern entrance to Rues Vertes; a large dugout offered shelter for about 40 stretcher cases and operating tents provided the necessary dressing rooms. On account of the exposed position and shelling of the road no reserve of ambulance transport could be maintained at this post, all of it was sent back to the M.D.S. At a car post, pushed forward along the road south of the canal and about two miles west of Crèvecoeur, one small car was kept and was fed by a bearer relay on the eastern edge of Masnières, north of the canal.

Up to the 5th no further move was made, the medical posts remaining unchanged, the number of wounded collected well

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under 50 a day; the weather remained fine but cool and in most cases the roads were in passable condition. On the 3rd the 1st Brigade was relieved by the 3rd Brigade, and Captain Ardagh, M.C., was at last able to leave the farm of Mon Plaisir after 36 hours of very dangerous and trying work which merited for him an immediate award of the D.S.O.

Signs of a German withdrawal were clearly seen on October the 5th: the IVth Army to the south had penetrated and turned the Beaurevoir–Masnières line, the Germans were shelling Vaucelles; it was time to be up and doing. Our patrols pushed forward across the bridge at Vaucelles and climbed the wooded heights beyond. By 1 p.m. the 3rd Brigade had reached the old Mill of Lesdain and another pleasant farm named Bel Aise while the 2nd Brigade were clearing the Cheneaux Wood. The weather was fine and warmer, and casualties were few, the total for the day was under 70, of which 41 were New Zealanders; but the following day owing to heavy shelling of the back and front areas our casualties were somewhat increased: over 100 were evacuated and we had two stretcher bearers killed. No important moves except a readjustment of the divisional front took place, and on the 7th the A.D.M.S. whose office had moved from Bertincourt to Trescault was making arrangements in view of a combined attack on the Masnières line timed for 4.30 a.m. on the 8th. Winter time had been introduced on the night of the 6th so that the zero hour now corresponded to mean solar time.

On the 8th the Third and Fourth Armies were resuming the attack with the object of exploiting their penetration of the Hindenberg defences. On the IVth Corps front the 37th Division on the right about Vaucelles, the New Zealand Division at Crèvecoeur and the 3rd Division on the left in the neighbourhood of Serianvillers were to advance to objectives about Esnes. No change in the medical dispositions was necessary as the advance was of limited depth. The night passed quietly, only 17 wounded were admitted to the M.D.S. The morning was dull, favouring our movements. By 8 a.m. the 3rd Brigade reported all objectives attained; they were in Esnes and patrols were in Longsart, nearly a mile further east. Many prisoners had been taken and much of our artillery was across the canal and in action on the east bank by 1 p.m.

At 7 a.m. all the horsed ambulance waggons were brought up to the A.D.S. and a car post was advanced to the north of Crèvecoeur in close touch with the R.A.P.'s. By 8 a.m. the walking wounded and some stretcher

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cases were reaching the A.D.S. and half an hour later the first waves of walking cases, brought down by lorries, were in the main dressing station. A light railway siding had been established in the farmyard and the first trainload was despatched at 9 a.m. at which time stretcher cases were coming in freely. The distance by road to Esnes was about 8 miles, no lying wounded from beyond Crèvevoeur, six miles distant, could as yet be in and there was a great congestion of traffic on the Rues Vertes–Marcoing roads delaying the wounded convoys. By 10 a.m. the M.D.S. was fully occupied, stretcher cases coming in in rapid succession, although up to this hour only 24 wounded in all had cleared Ribecourt. Two dressing rooms were in use: one for stretcher cases with four tables; the other for walking wounded; there was adequate accommodation in the large rooms in the farmhouse. But in the afternoon the flow of wounded had reached highwater mark—over 250 had come in since 6 a.m.—and owing to the long distance run to be covered by the M.A.C. cars there was delay in evacuation. The wounded on stretchers were accommodated in the farmyard, but the afternoon was bright, sunny, and warm, an ample supply of blankets was available and all appeared comfortable as they were well plied with hot cocoa and such food as they cared to eat.

Especially happy and patient were the German wounded; a burly Saxon lying contentedly on his stretcher, ravenously munching a large chunk of bread and butter and drinking with gratitude from a mug of cocoa, was jocularly asked by one of our medical officers to sing the hymn of hate while he was inspecting the injury—a flesh wound of the thigh. "Give us a Gott Straafe Fritzy," said the major. "Nein! nein!" beamed the Saxon through his wide horn rimmed glasses, "a Gott Straafe vil I not gif," and went on volubly to explain that he was a Saxon of the blue eye and fair hair, that Saxons and Anglo-Saxons were cousins, that the war was a cruel business in which only the capitalist thrived while the worker suffered and died to save the plutocrat, and a lot more of Lord Northcliffe's propaganda stuff with which the German soldiers had been fed by our aeroplanes for weeks past. Happily wounded, and away from the hunger and misery of it all the Saxon soldier, in a torrent of broken English, expressed his gratitude and proclaimed aloud the universal brotherhood of man. Of such thoughts and intense sensations—for the Saxons are a kindly sentimental people, but little less so than the Anglo-Saxons—the German revolution of November, was born.

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At 7 p.m. a second trainload of walking wounded was despatched, but the number of stretcher cases awaiting evacuation was considerable, there were very large numbers of German stretcher cases coming in. Evidently the fighting had been severe. Lieut.-Col. Craig managed to get cars up to Crèvecoeur late in the afternoon, which greatly facilitated the evacuations and reported all R.A.P.'s clear at 6.30 p.m., but the A.D.S. was not clear until 10.30 by which time the stream of wounded had dried up somewhat. The A.D.M.S. reported his medical arrangements as working without a hitch, and the numbers of wounded of the New Zealand Division cleared by 7 p.m. as 17 officers, 181 O.R. and, in all, 476 casualties evacuated during the 24 hours. But at the M.D.S. the work continued during the night, the dressing tables were just able to keep pace with the evacuations and at 11 p.m. there were still 60 stretcher cases in the yard awaiting attention: many of these German wounded recently come in from the A.D.S. Towards midnight a few extra cars were obtained from the 30th M.A.C. which helped to relieve the temporary congestion, but the station was not wholly clear until 6 a.m. the following morning. In the 24 hours ending at 10 a.m. on the 9th the M.D.S. had evacuated 843 wounded, of which 50 per cent. were stretcher cases; the New Zealand Division had sustained in the neighbourhood of 460 casualties exclusive of killed. We had now definitely smashed through the Hindenberg line and the whole division was across the canals and the Masnières line; in front lay open country towards Le Cateau, whither the Germans were hurriedly withdrawing through wooded lands untouched by war.

If we include the penetration of that portion of the Beaurevoir-Masnières system with its 50 yard deep belts of heavy German wire which still barred our way to open country on the morning of the 8th, the passage of the Hindenberg system by the New Zealand Division may be said to have occupied 10 days from the 29th September to the 8th of October, both days included, during which period of continuous fighting, some 7 miles of trenched positions was passed with a total casualty list of under 2000 killed, missing or wounded; actually the M.D.S. evacuated 1399 wounded of the New Zealand Division from the 29th to the 9th of October. The number of wounded reported to the A. and Q. Branch by battalions was 1345, while 238 were reported killed and 365 missing. A large proportion of the missing, no doubt, were killed as we lost few prisoners; but some of the missing had passed through extra-divisional dressing stations. The casualties

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recorded in these operation compare very favourably with those sustained by the Division at, say, Messines in a three-day battle but the conditions were wholly dissimilar: smaller assault formations were used and the defence, more especially by artillery fire, was much less powerful, while shelter in the trench systems was everywhere available.

On the 9th before dawn, a touch of early frost whipping the air the 2nd Brigade were advancing under a barrage, but they met with no resistance, the Germans had withdrawn to the line of the Selle River. Through Longsart our Brigade passed at nine and by dusk had pushed patrols into Fontaine-au-Pire and Caudry, having covered three miles during the day. Very few wounded came in to the A.D.S. which at 3.30 moved up to Longsart and opened in small farm buildings. A site for the M.D.S. had been selected during the morning and late in the afternoon Lieut.-Col. Murray took over a large farm at Le Grand Pont hamlet half a mile west of Esnes. Divisional headquarters were at Lesdain in the evening; the A.D.M.S. reported 26 wounded admitted for the day. At the M.D.S. the buildings were undamaged by shell fire and afforded warm billets for the ambulance personnel in the out houses and barns; bunks with fine wood shavings used by the German troops provided beds, a luxury unknown for many days past. A party of eight unwounded Germans was found to be hiding in the barn, and was, for the nonce, attached to the field ambulance for general duties.

During the two following days the advance continued until Briastre and the crossings of the Selle were reached, where a halt was imposed by stern Jägers, who held the eastern banks. Our advance guard was over the river by the night of the 11th having passed by an improvised bridge thrown across by our Engineers, but a formal attack was necessary to force the stoutly held positions; this was arranged for on the 12th. At the M.D.S. the German prisoners proved useful, two of them were engineers employed in demolition work, and in gratitude for their kindly treatment by the ambulance no doubt, they extracted two large unexploded mines from the farm precincts. No. 3 Field Ambulance was now ordered up from Bapaume, and on the 11th took over the Grand Pont station from Lieut.-Col. Murray who advanced his M.D.S. to the A.D.S. site at Longsart in a small cluster of farm buildings providing only limited accommodation. The A.D.S. moved to Fontaine au Pire.

The battle of the 12th was to establish the Division on the eastern banks of the Selle in front of Briastre. The attack was

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to be carried out by the 1st Brigade under an artillery barrage, the 37th Division on their right, the Guards Division north about Solesmes. Our ultimate objectives were to be a high spur to the east of the railway to Solesmes—over a mile from Briastre. Extra bridges and pontoons were to be thrown across the stream by our Engineers during the day. The Medical Corps stations were not altered except that a corps walking wounded post was to be established by the 3rd Field Ambulance near Crèvecoeur where an entraining point on the light railway would be available.

The 1st Wellington Battalion had to fight hard to make good the bridge head, and it was not until 6 p.m. on the 12th that they captured the Bellevue Station on the railway running to Solesmes. The Jäger Division which had previously rough handled the 3rd Brigade at Dead Man's Corner had to give way, but they fought to the last and very few of them surrendered. At the A.D.S. some 100 casualties from the Division were brought down from a car post west of Veisly and a bearer relay in the vicinity of the village. The M.D.S. was moved into Beauvois during the afternoon and opened at 5 p.m. in a large building, evidently a school, which had been used as a hospital for lightly wounded and sick by the German Medical Corps. There was good accommodation: the buildings being untouched by shell fire, the windows even intact and above on the top floor were warm rooms furnished with bunks where the personnel found comfortable quarters. Shortly after midnight the station was clear; the run to C.C.S. was now consuming seven hours but there was no congestion of wounded as the numbers fell off considerably after 6 p.m. That night command of the sector passed to the 42nd East Lancashire Division and the New Zealand Division went into reserve in the area which they had captured about Beauvois Esnes and Longsart where the few civilians remaining did their best to make them welcome.

During the operations which had been initiated on the 29th of September, up to the 13th of October, a period covering a fortnight's constant and at times severe fighting, the A.D.M.S. reported that the evacuation of wounded had invariably been carried out rapidly without any apparent difficulty and without serious losses to medical personnel, a success which he attributes to the satisfactory condition of the roads which enabled motor cars to be pushed well forward and allowed the bearers to use wheeled stretchers to the fullest extent. During 16 days of September 94 officers and 2264 O.R. wounded passed through the dressing stations and for

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the first 12 days of October 75 officers, 1934 O.R. These results were not achieved by good roads and forward car posts only, but the experience of the N.Z.M.C. N.C.O.'s and the forward evacuating officers counted for much. Close touch with the R.A.P.'s was maintained by detailing parties of bearers to each R.A.P. and the daily personal visits to the R.A.P.'s by the officers, more especially Lieut.-Col. Craig and his forward evacuating officer, Captain Wyllie, N.Z.M.C., were the chief means of securing smooth and rapid evacuations. The principle of using one field ambulance reinforced by the pooled bearers and transport for forward evacuations and another for service at the M.D.S. was adhered to by the A.D.M.S. with excellent results. A summary of the work done at Lieut.-Col. Murray's M.D.S. during the period 29th September to the 13th October shows that a total of 2501 wounded were dealt with; of these, 1202 were stretcher cases, that is to say 48 per cent. lying, 52 per cent. sitting or walking. Included in the total were 1572 New Zealand wounded; 605 British and 324 German wounded. For the period under review the following casualties were reported to the A. and Q. Branch of the New Zealand Division:—

CASUALTIES NEW ZEALAND DIVISION 1ST OCTOBER TO 13TH OCTOBER (both inclusive)

	K.	W.	M.	Total
Officers ..	24	82	3	109
Other Ranks ..	328	1865	401	2594
Totals ..	352	1947	404	2703

Of the missing many were killed, a few admitted to other formations as we lost an insignificant number of prisoners. The discrepancy between the numbers of New Zealand wounded evacuated from the M.D.S., 1572, and the figures reported to the A.A. and Q.M.G. may be accounted for in several ways. Many wounded suffering from trivial wounds remained on duty; a few would be discharged from the A.D.S. to their unit, others after an injection of A.T.S. at M.D.S. would go back to their battalions.

There was no alteration of importance in the medical dispositions during the period of rest, except that a dental hospital was opened at Beauvois and one dental section was attached for duty to No. 3 Field Ambulance. With rest and the usual training the health of the Division improved considerably, the sick rate being 8.8 per 1000 on the 19th October, well below the average of the Third Army. Already some grumblings of the winter influenza epidemic, much more severe than the summer affliction, were heard: it was prevalent in all European countries

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by the middle of the month and warnings had been issued by G.H.Q. The grave broncho-pneumonic complications with high mortality of 21 per cent. had already been observed in small numbers in the British Armies. German prisoners of war had been attacked shortly after capture. The prevention of overcrowding in billets and a sharp watch on the rise of the epidemic were enforced in all divisions; special orders as to the admission to C.C.S. of all cases of influenza were issued; and the sterilization of all contact material such as blankets and utensils, was particularly stressed. Already New Zealand troops had suffered heavy casualties from this mysterious plague. In January, February, and March, 1918, a severe type of purulent bronchitis associated with rubella or morbilli had broken out at Sling Camp amongst the 32nd Reinforcements. It is stated that the infection arose at Newport News. There was a high mortality rate exceeding one-third fatalities. Owing to the demonstrated lack of immunity to the *Pneumococcus* shown by New Zealand soldiers it had been agreed to immunise the incoming reinforcements with a mixed catarrhal vaccine prepared by Dr. Eyre of St. Thomas' Hospital in collaboration with Captain Lowe, N.Z.M.C., bacteriologist at No. 2 New Zealand General Hospital. The prophylactic inoculation with two doses of the original vaccine caused little disturbance and was made obligatory for incoming reinforcements. But the very serious late autumn outbreak of purulent bronchitis on the transport "*Tahiti*," carrying the 40th Reinforcements stated to be associated with influenza, and the summer epidemic of influenza in England, brought universal immunisation for New Zealand troops in England into practice at the end of September, 1918; but rather late, as it proved, for the winter epidemic, which caught some of the camps during the very process of immunisation. The advisability of immunising the New Zealand troops in France was suggested to Colonel McGavin by Colonel Parkes, but the opinion of the consulting physician of the Third Army, Colonel Heringham, was not then strongly favourable to the proposal, nor did the A.D.M.S. of the New Zealand Division consider the moment opportune for such immunisation, as the Division was engaged in active operations of a critical nature. The proposal was not adopted in France, although in England, Lowe and Eyre claimed encouraging results from the prophylactic injections. In the last weeks of October the first wave of the epidemic was upon the Division and was considered to have been introduced by men returning from leave in the United Kingdom as the spread was

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simultaneous through many dissociated units; but the full virulence of the pandemic was not demonstrated until November.

But the passage of the Selle river was not yet completed: the enemy was holding the crossings in strength and seemed to have adequate artillery support. The line of the Sambre and Oise Canal to the south of the Selle was forced on the 19th by the Fourth Army and American troops, and on the 20th the Third Army was again attacking the disputed crossings of the Selle north of Le Cateau. That day the 42nd Division, on our Corps front, marched at 2 a.m. from Briastre, and although held up by serious resistance, much wire, and frequent counter attacks, advanced to positions a mile east of Solesmes. It was now the turn of the New Zealand Division to exploit the success.

Sir Douglas Haig was determined to strike such a blow upon the badly demoralised and diminished German armies as would compel them to lay down their arms before winter came. His goal was the line Valenciennes–Mormal Forest and to these ambitious objectives he was directing his tired divisions in his final battle of the 23rd. Germany was groggily hanging to the ropes, Britain was preparing a solar plexus punch.

Our Division was to pass through the 42nd at 8.40 a.m. on the 23rd, a determined advance was to be pushed through under barrage with the object of seizing bridges across the Ecaillon river at Beaudignies near Le Quesnoy. Our brigades were concentrating on the 22nd, the 2nd Brigade was to lead the advance. At a conference of field ambulance commanders at the office of the A.D.M.S. at Beauvois on the 22nd there was a final revision of the medical arrangements. No. 1 Field Ambulance had by now taken over the M.D.S. at Beauvois as a D.R.S. and was instructed to admit and hold all sick collected during the operation. Lieut.-Col. Murray, was ordered to take the duties of forward evacuating officer; already a site for an A.D.S. at Solesmes had been reconnoitred by Major Jory, N.Z.M.C. and advanced parties sent on in the early afternoon. No. 3 Field Ambulance under Lieut.-Col. Hardie Neil, that day decorated with the D.S.O. for his good work about Bancourt, was to open a M.D.S. at Veisly; his advanced party of one tent subdivision under Major Goldstein, M.C., was moving up to take over. Lieut.-Col. Murray returned to his unit, now marching in heavy rain to Solesmes, the bearers, without packs, on foot, the tent subdivisions with light stores transported in motor ambulances. The packs and heavy equipment had been stored at Beauvois. 40 bearers were detached to the 2nd Brigade: one runner, eight bearers to each R.M.O.,

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extra bearers and all available transport had been forwarded to the A.D.S. with the exception of two larger motor ambulances remaining at the D.R.S. Special instructions had been issued with regard to the disposal of civilian casualties who were to be evacuated by M.A.C. to the C.C.S. at Ytres. or in case of urgency to the 59th C.C.S. at Awoingt, near Cambrai, 4½ miles west of Beauvois along the main road from Le Cateau; the distance from Solesmes about 11 miles, or from the M.D.S. at Veisly, under 10 miles; whereas to Ytres the distance exceeded 35 miles. Much difficulty had been experienced in bringing up the casualty clearing stations sufficiently rapidly in rear of the advancing Armies. In many instances these units, long immobilised by static warfare, were obliged to pack up at short notice and to open in tents with a diminished staff and equipment and were in consequence unable to operate on as many cases as seemed desirable, but in spite of all difficulties their technical work suffered little by these rapid moves. The general hospitals, owing to the very broken state of road and rail communications in the devastated country, could not be moved forward, at least until some considerable time had been allowed for a readjustment of the traffic conditions in the battle areas.

No less than four divisions of the IVth Corps were advancing on the same narrow front on the 23rd and at the appointed hour the New Zealand Division represented by the 2nd Brigade with the 37th Division on their right, passed through the 42nd and 5th Divisions respectively. Our 2nd Brigade, from in front of Romeries astride the road to Baudignies met no opposition until descending the western slopes of the St. Georges River: here they had casualties from artillery and machine-gun fire, but pressing on they found the enemy resistance rapidly failing. Baudignies was taken, and through the night the two bridges at that village across the Ecaillon were made secure by outposts 1000 yards to the eastwards of the crossing. The casualties had not been heavy. At 8.30 a.m. the A.D.S. opened at the Brasserie L'Abbaye in Solesmes: a fine, roomy building with good cellars, but as the Germans had recently used it for stabling their horses, it needed vigorous work through the night to prepare for the reception of wounded. In the cellars, which were well lighted, and well ventilated, a dressing room capable of accommodating 100 stretcher cases was made ready with a reception room for walking wounded in the office. Lightly wounded were arriving by 10 a.m. and a car post had been established in a sunken road south of Romeries. The bearer relay post occupied a farm at the

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southern boundary of Vertigneul and after the passage of the St. Georges River in the afternoon, the R.A.P.'s of 1st Canterbury and 1st Otago were located by Major Jory near Pont a Pierre at the site of the bridge across the St. Georges on the road to Baudignies from Romeries. By 6 p.m. the tally of wounded was only 5 officers and 55 O.R. The weather kept fine all day but there was much delay in clearing wounded from the A.D.S. to the M.D.S. at Veisly owing to the great congestion of traffic all converging to a temporary bridge constructed by the New Zealand Engineers at Briastre. The transport of four divisions moving in opposing streams produced a condition similar to that seen about Ypres in 1917, the destruction of the Selle bridges was the cause of the congestion, most noticeable about Briastre. Divisional headquarters having moved into Solesmes in the afternoon the A.D.M.S. proceeded to reconnoitre an advanced position for the A.D.S. and selected the farm at Vertigneul at present used as a bearer relay. As the result of the fighting about Baudignies, many more wounded came in through the night. The following morning the A.D.S. advanced to Vertigneul where the farm buildings offered only moderate accommodation, the M.D.S. moved up to Solesmes taking over the Brasserie previously occupied by No. 2 Field Ambulance. There was considerable shelling of the divisional area during the day, increasing our casualties, and by 6 p.m. the wounded of the Division admitted was over 200 for the previous 24 hours, or about 300 for the two days. Amongst the wounded there was a high percentage of gas casualties. We had 1 killed and 4 wounded in the N.Z.M.C. owing to heavy shelling of the forward areas during the day. The car post had been advanced to Pont-a-Pierre and the bearer relay close in to Baudignies, but the same congestion of traffic delayed evacuations and the roads were in poor condition. All R.A.P.'s were reported clear by 6.30 p.m.

The days that followed until the end of the month were occupied in semi-trench warfare, a gradual infiltration of the German rearguard positions; the daily casualties not exceeding 40 to 50; there were no concerted operations and no alteration in the medical dispositions. By the 27th the New Zealand outposts had crossed the vital railway to Valenciennes. That day there were many gas casualties, and so serious was the gas concentration that it became necessary to remove all civilians in the vicinity of Baudignies in our ambulance cars; while we lost a car post, blown up at Pont-a-Pierre, with four casualties to the N.Z.M.C. party there. In order to avoid the shelled area a road

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to the north had to be used for evacuation of wounded on Caudry where the 59th C.C.S. was established on the 28th. The total casualties brought in to the field ambulances for this period from the 23rd to the end of the month was over 400.

Valenciennes was entered by the Canadians on the 1st of November, but as yet no signs of a German retirement were evident in front of the Third and Fourth armies between the Scheldt and the Sambre. Too much valuable war material was lying just behind the German front now on the point of withdrawing to the Antwerp–Meuse position. The war material they were attempting to salvage but, above all, the 80,000 German wounded in feld lazarets and forward hospitals must be removed to safety. Marshal von Hindenberg tells us that the wounded could not be left behind for the honour of the German Armies; while Ludendorf curiously deplores the loss of his delousing stations, which had to be abandoned. At no point in the advance of the New Zealand Division did we overrun any German field hospitals yet open, the wounded that remained in our hands we gathered in from the field, casualties of the day. Great indeed must have been the energy and determination of the German Sanitats Kompagnien who so faithfully evacuated their wounded, and with very poor transport, from the rapidly crumbling rear guards. In order to hasten and to demoralise the retreat a general advance by the First, Third and Fourth Armies over a 30 mile front from Valenciennes south to Oisy on the Sambre, was ordered for the 4th November; the final operation of the Great War.

The part to be played by the New Zealand Division was to capture Le Quesnoy, clear part of the Mormal Forest, and advance to objectives beyond it on the road to Bavais and Mons. The last battle fought by the New Zealanders in the Great War, the most successful operation of the Division, was graced with a tincture of romantic adventure. Guarding the high road to Bavais and Mons lay, pathetic anachronism, an 18th century fortress, perfect miniature of Vauban's geometric art. The last in the chain of frontier fortresses which barred Marlborough's road to Versailles after Malplaquet and from whose walls the sullen shamefaced British troops were drawn off by secret pact in 1712, while Prince Eugene pursued the siege alone. Those were the spangled days of Pompadour warfare and sieges "according to the art"; and if the battles were few, the slaughter and the sufferings of the wounded were great. Both armies had combined to clear the battlefield of wounded, two days after the costly victory at Malplaquet where 20,000 dead and wounded lay

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in great part untended; and down the road from Bavais to Quesnoy, some 200 waggons bearing French wounded had streamed, grinding their piteous wheels towards Solesmes. Quesnoy had already suffered many sieges; it stood on Roman highways that led into France from Cologne through the narrow way between the Scheldt and the Sambre; great swamps and primeval forests—of which some islets still remained—had once flanked the way. On the same ground where all the races of Europe had at one time or another struggled throughout the centuries, in the cockpit of Europe, men from the most remote marches of the world, their feet set in the tracks of 1914, were mustering to fight the last battle of the greatest war.

But Quesnoy was not to be attacked; too many defenceless civilians mostly women and children were within the walls. Le Quesnoy, the strong place, was to be denied the last rites, the rubric and ritual of a siege according to the decencies of the art, not battered by a siege train nor approached by sap and parallel but gently veiled in a smoke screen projected from our guns while our brigades brushing swiftly by and joining hands to the eastwards broke through the forest beyond, leaving Vauban's masterpiece in the hands of a mopping up party!

Such in brief were the battle orders of the Division examined at a conference of ambulance commanders in the office of the A.D.M.S. at Solesmes on the 3rd of November. The medical dispositions included the advance of the A.D.S. to Baudignies where it was to open at 8 a.m. on the 4th, and, as the battle line went forward, was to push on about midday to the eastern vicinity of Quesnoy in a locality to be decided upon by reconnaissance in the morning. A car post to be established at the eastern outskirts of Baudignies would serve a bearer relay posted in the sunken road leading to Orsinval near the Fort Martin farm. All the bearers of No. 1 Field Ambulance and all available ambulance waggons were to be placed at the disposal of the commander of the A.D.S. and the usual complement of N.Z.M.C. bearers and runners was to be distributed over night to the R.M.O.'s about to be engaged.

At 5.30 a.m. on a misty morning the 30 mile battle line advanced: the New Zealanders, hidden by the smoke screen and sheltered by their barrage, completed the envelopment of Le Quesnoy, taking many guns and prisoners. By noon the 1st Brigade passing through the 3rd was advancing from Herbingnies but Le Quesnoy, now several thousand yards in rear of our front line, still held out. By 6.30 a.m. walking wounded and stretcher

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cases carried down by German prisoners were entering the A.D.S. and by 10 a.m. 34 stretcher cases, 138 sitting and 127 walking wounded had been evacuated to the M.D.S. Owing to the unexpected resistance of Quesnoy still spitting fire from its ravelins and bastions the A.D.S. could not, as was hoped, be advanced at midday and owing to the congestion of traffic on the roads the evacuation of wounded was so delayed that at least two and a half hours were spent in transporting the wounded down to Solesmes less than seven miles by road from Baudignies. To add to the transport difficulties the forward roads had been mined here and there by the retreating Germans and large craters had destroyed the road surfaces. Our patrols were well beyond the appointed objectives by 3 p.m. and at this time all R.A.P.'s were reported clear of wounded.

Le Quesnoy, not to be denied, after the customary summons to the garrison—our trumpet was an aeroplane—was ultimately taken by assault and escalade. With ordnance strangely suggestive of the top boots of my Uncle Toby, the fire from the ramparts was beaten down; the covered way was crowned; the outer ditch crossed; the garrison driven from the ravelin. And at 4.30 p.m. impatient riflemen crossing the caponier and the tenaille, gained the foot of the curtain by a stone weir—said to have been erected by a bishop who wanted a carp pond and who evidently cared nothing about the art of fortification. Two officers planted their ladder against the 30 foot curtain, so gaining the ramparts, other riflemen at their heels drove the garrison into the casemates and flung open the Valenciennes gates to our advance. If we except the taking of Ulm which was surprised in 1706 by young personable officers camouflaged as ladies, no such headlong wooing of a fortress is recorded in history: the siege lasted four and a half hours only from the investment to the capture by assault. History repeating itself could again say, as the French had written when they retook Le Quesnoy in 1712, "A warmer siege was never seen."

By 6 p.m. 98 stretcher cases and 193 sitting had been evacuated and 7 mortally wounded had died in the A.D.S. Three German R.M.O.'s and their dressers were now attending to the German wounded, but it was not until 10.30 p.m. that the A.D.S. was clear. Lorries coming up in the evening assisted in removing the last of the German walking wounded. During the 14 hours that had elapsed since zero hour, the total of wounded treated and evacuated was 860, of these, 246 stretcher cases. Close touch had been kept with all R.A.P.'s of the 1st Brigade, now far to

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the east of Quesnoy in the villages we had captured, where a few delighted civilians gave what help they could. Very few wounded came in during the night and by 9 a.m. on the 5th the A.D.S. had opened at Villerau a mile beyond Quesnoy on the road to Bavais.

At daybreak the 2nd Brigade passing through our outposts worked their way along the northern fringe of the Mormal Forest and by evening had emerged on the eastern limits within a few miles of Bavais. Heavy rain coming on about 9 o'clock clogged the roads for transport and delayed the passage of wounded to the M.D.S. now pushed on to Baudignies. At midday the 3rd Field Ambulance took over the "Hospital Civil et Militaire" in the Rue Thiers in Le Quesnoy. The building had been recently used by the Germans as a military hospital and was found littered with debris and in a very untidy condition. A sister of charity was the only attendant left. The military side of the hospital built in brick was modern and had five good wards of 20 beds each with a well fitted operating theatre. The civilian hospital had several wards and side rooms; the administrative block, out offices, and kitchen, were all of a useful and commodious type. No such ambulance location had ever before fallen into our hands. Wounded came in during the afternoon from our own and other divisions, and later a large batch of German wounded with their medical officers and orderlies were discovered in the casemates of the town ramparts, evidently the regimental medical detachment; in all 20 German stretcher cases were brought in. The heavy rain prevented the evacuation of the hospital during the night, but comfortable quarters and an abundance of palliasses stuffed with fine shavings, spoils of the victors, aided by the enraptured attentions of the liberated civilian townsfolk, made all snug and comfortable. At 6.30 p.m. command of the sector passed to the 42nd Division and the New Zealand Brigades had orders to withdraw into billets in the neighbourhood of the captured city. By 10 p.m., when Lieut.-Col. Murray closed his A.D.S. and opened a temporary M.D.S. for the 42nd Division, he had evacuated for the previous 24 hours: 50 stretcher cases and 79 sitting. The total wounded treated by the ambulances from the 4th to the end of the operations at Le Quesnoy as reported by the A.D.M.S. was:— officers, 25; O.R., 436; the total evacuated: 785, including 165 wounded prisoners of war; while the N.Z.M.C. casualties included in the total were 3 wounded, 1 critically. Amongst the wounded was an odd case needing special lines of evacuation:

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a sergeant of the 3rd Brigade was bitten in the hand by a German messenger dog on the 4th, the faithful hound escaped after his exploit and our damaged sergeant had the pleasure of a trip to Paris, where the Pasteur Institute watched over his convalescence, which was uneventful—the dog clearly was not mad, except in fighting a forlorn hope.

Our last battle had been extraordinarily successful. The Division had advanced seven miles in two days, had captured a fortress and several villages, had taken over 2000 prisoners and many guns; and our losses were very light in proportion to the gains achieved. The 2nd Field Ambulance continued to function as an M.D.S. until early on the 6th, as the 42nd Divisional R.A.M.C. had difficulty in getting up stores owing to the congestion of the roads. Bridges across the Prechettes stream had been destroyed and at one point near Pont Billon it was found necessary to drag one of our light ambulance waggons across a railway bridge as the only practicable route for the returning advanced bearers who came in by 10 a.m. By midday all New Zealand wounded were clear of the 2nd Field Ambulance, only some German wounded in charge of their own medical officers and orderlies remained; these were the last wounded to be admitted and discharged from a New Zealand Field Ambulance. At Le Quesnoy No. 3 Field Ambulance was busily engaged in making ready for any emergencies at the hospital. By orders of the Maire a bevy of women and children all armed with brooms, besoms, and other implements of cleanliness, appeared in the wake of the town crier and fell upon the wards and rooms of the Hospital which Lieut.-Col. Hardie Neil had taken over under very unsatisfactory conditions from the outgoing unit—as he states in his diary. But a detail of 50 German prisoners, presumably the after party, materialised from the divisional cage and in a short while wards and rooms and yards were brought to a condition of passable cleanliness and in this guise were duly handed over to the 3rd Canadian C.C.S. on the 9th.

M. Poincaré visited Le Quesnoy on Sunday, the 10th, when the troops including No. 3 Field Ambulance paraded in the Grande Place and there was martial music and much rejoicing in the old town; and still greater rejoicings on the morrow; for the end of the Great War had come. Sister Divisions of the IVth Corps had pushed on manfully beyond Bavais but the 8th Division of the First Army had beaten them in the race, and reached the goal of long desire: and so the five year battle of the British Armies ended where it began—at Mons.

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A Regimental Aid Post in Moving Warfare, 1918.

The Last of the Wounded.

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CHAPTER XX.

N.Z.M.C. in Sinai and Palestine.

When the New Zealand Division left Egypt in April, 1916, the New Zealand Mounted Brigade Ambulance, as we saw in Chapter VII., remained with its Brigade—both units now dissociated for the rest of the war from the New Zealand Division.

The Anzac Mounted Division under General Chauvel, A.I.F., comprised four brigades: three of Australian Light Horse, and one of New Zealand Mounted Rifles. To each brigade a cavalry ambulance was attached:—the 1st, 2nd and 3rd Australian Light Horse Ambulances; and the New Zealand Mounted Ambulance. The work of these units while attached to the New Zealand and Australian Division in Gallipoli has already been referred to. In April the New Zealand Mounted Field Ambulance was at Ferry Post, accompanying its brigade on outpost duty some seven or eight miles East of the Suez Canal. The ambulance, at this time commanded by Lieut.-Col. Hand Newton, N.Z.M.C., was organised in two sections, and in accordance with the existing establishments of a British cavalry ambulance. There were six medical officers and about 120 O.R., including N.Z.M.C. and N.Z.A.S.C. drivers attached; the transport, which had come from New Zealand comprised ambulance waggons and general service waggons of Dominion manufacture and seven motor ambulance cars provided in Egypt. The medical equipment was similar to that of the field ambulances, consisting of medical and surgical panniers and ordnance material. The tentage comprised circular tents and two operating tents giving shelter for 50 patients.

At Serapeum, near the railway station, the headquarters of the Anzac Mounted Division were established. The A.D.M.S. was Lieut.-Col. Downs, A.M.C. with Captain Hercus, N.Z.M.C. of the New Zealand Mounted Ambulance as D.A.D.M.S. On 6th April the Division moved up to No. 3 sector of defence, based on el Kantara and on Salhia or Salahieh, where the New Zealand Mounted Field Ambulance was encamped with the brigade on the edge of the cultivated land. It was from this point, probably, that Moses headed his caravans towards Sinai, and it was also at this spot, certainly, that Napoleon concentrated his four divisions for the Syrian Campaign. The New Zealand Mounted

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Brigade group, under the command of Brigadier General Chaytor, C.M.G., D.S.O., including the New Zealand Machine-gun Squadron, a territorial R.H.A. battery, 2 camel companies, New Zealand Engineer troops, the mounted ambulance and the train numbered a little more than one of Napoleon's depleted infantry divisions: just over 2500, so that the Anzac Mounted Division with its four brigades and attached units was about as strong as the French force that advanced into Sinai in February, 1799.

During the month the ambulance reorganised its transport for desert warfare. Six sand carts—two-horsed light drays with a square hood and very broad tyres—each accommodating two stretcher cases were substituted for the ambulance waggons; while camels were provided for carrying wounded in cacolets, and for the transport of rations, water, equipment, and bearers.

Towards the end of April the advanced troops of a Turkish Expedition, moving westward to attack the canal north of Kantara, had reached the Katia Oasis, driving in English Yeomanry who were holding that position. The Anzac Mounted Division marched out to meet them and finding no Turks in Katia, occupied Dueidar, 15 miles, and Romani, 25 miles out from Kantara. In these movements the New Zealand Mounted Field Ambulance journeyed with its brigade—then in Reserve—to Hill 70, some seven miles east of Kantara. It had followed the route trodden by man from time immemorial from Salahieh—the last town in the Nile Delta on the edge of the desert, the point of departure of the old caravan route from Egypt to Syria—and, if we are to believe certain authorities, midway between their point of departure and Kantara, they passed over the very spot where Pharoah's army was lost in the Serbonian Bog, or the old Pelusiac branch of the Nile.

Early in May the desert transport of the ambulance was completed by a camel section comprising 81 natives under a warrant officer and 140 camels. Of these, 29 camels were for equipment, 17 to carry cacolets providing transport for lying and sitting cases, and 77 baggage camels for personnel. About this time Major Mathew Holmes, N.Z.M.C., joined the ambulance and took command of "B" section; but experience was beginning to show that the old two-section arrangement was not practical for desert warfare.

It was now the Khamsin season; the average midday temperature rose to 109° F. or over in the shade of the double tents. Much reconnaissance work was in hand and there were many casualties from heat stroke amongst the unseasoned troops,

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as yet learning their first lessons in nomad life and gaining experience in the problem of desert transport. Expecting some fighting in a lengthy reconnaissance as far as Bir el Jeffeir on May 15th, the New Zealand Mounted Field Ambulance was ordered to Katia for the purpose of forming a dressing station there, and had orders to send small detachments with sand carts and sledges for wounded transport with the brigade. The only casualties were 2 officers and 29 O.R. suffering from heat stroke, who were evacuated via Romani to el Kantara by the new military railway under construction. On the 16th May the thermometer registered 117° F. in the coolest double tent of the mounted field ambulance.

Other expeditions with reconnoitring bodies early convinced Lieut.-Col. Hand Newton that his bearer sub-division required to be mounted. At first mules were provided for this purpose as there was no authority as yet for the reorganisation of the New Zealand Ambulance. The Australian Light Horse Field Ambulances and the British Cavalry Ambulances had already an allotment of horses for 24 bearers. The baggage camels were found to be too slow to keep up with horsemen, and were otherwise unsuitable, so that the camel sections were withdrawn from the field ambulances at least until further experience showed that a cavalry field ambulance fitted for desert warfare required to be subdivided into a mobile and a so called immobile section.

At the end of May our ambulance moved to El Debabis to form a dressing station, sending on mounted bearers with sand carts with the column patrolling as far as Bir el Abd about 20 miles from Katia. One, lightly wounded, riding his own horse, and one wounded Turk were brought in; the ambulance returning by Ogratina to Bir et Maler and a date-palm plantation or Hod, which they had occupied as headquarters since early in the month and where they remained until near the end of June.

Experience gained during the reconnaissance period showed that the existing pattern of desert cart, which required six horses in sandy country, was too light in construction; the square hood was flimsy and soon broke away. Sand sledges on broad four-inch runners with two horses proved successful for stretcher cases and gave an easy ride to a seriously wounded man. The camel cacolets were very uncomfortable, and the camels were too slow. The lying cacolets, on account of their unruly movements, were almost impossible for seriously wounded men. Stretchers of regulation pattern proved very difficult to carry on horseback, so that the need of a lighter pattern, or a folding

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type, was keenly felt by the regimental stretcher bearers. As the result of these varied experiences a new ambulance organisation came into force in the middle of June. Each cavalry ambulance now formed a mobile section constituted as follows:—The Tent Subdivision of the Mobile Section had a personnel of 2 officers, 1 W.O., 1 staff sergeant, 2 cooks, 8 nursing orderlies and 1 clerk. The Bearer Subdivision, commanded by a captain, had 9 mounted bearers N.Z.M.C. or A.M.C. The transport consisted of 8 sand carts, 10 cacolet camels for lying cases, 15 cacolet camels for sitting cases, and there were 32 draft horses for the sand carts. This provided transport for 36 stretcher cases and 30 sitting, while the remaining camels were utilised for the transport of water, equipment and rations. In all, the Mobile Section had: 4 officers, 40 O.R., 40 draft horses, 16 riding horses and 44 camels. The only wheeled transport was the broad tyred sand cart. The Immobile Section was manned by the remaining personnel and held the bulk of the heavy equipment. The newly constituted Mobile Ambulance Sections were tried out in June and July, and seemed well adapted for their work. But some further re-organisation of the Mobile Section was authorised at the end of July. Provision was made for an increase of personnel up to 5 officers, 74 O.R., cacolet camels were increased to 25 for sitting cases, and the original allotment of one camel for water carrying was found to be so inadequate that the number was increased to 8. A new pattern sand cart of much more durable structure was issued; it had a rounded iron framed hood, and, in spite of added weight, it was considered an improvement on the earlier type. The ambulances had much to do in reorganising their equipment and arranging for a well ordered distribution of loads as the Mobile Sections only were to accompany the brigades into action. The Immobile Sections of the ambulances, having now a very limited personnel, heavy equipment and no transport, could be utilised only on the railway, and must, to a certain extent, be pooled for the formation of a divisional collecting or main dressing station. All these arrangements were shortly to be put to the test in the battle of Romani.

General Chaytor, who was making a personal reconnaissance in an aeroplane on July 19th, observed long columns of the enemy approaching on an eight mile front from Bir Salmana, less than 20 miles east of Katia. The 52nd Lowland Scottish Division, which had been at Helles in 1915, and was now holding the railhead near Romani, moved up into prepared defensive positions while our cavalry outposts, keeping close watch on the enemy

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movements, gave way gradually as the columns of the 3rd Turkish Division drew on to Romani. On the 25th there came a polite note dropped from a German aeroplane warning our ambulances that their red cross flags were not sufficiently visible from the air, a matter to which the ambulances gave serious attention. Large crosses were traced on the sand near the dressing stations which our own aeroplanes reported to be clearly visible at 7,000 feet. Similar red crosses, on a large scale, were constructed with broken bricks on a white-washed ground in France in 1918, by our ambulances near Bapaume.

On the 3rd of August the Turks occupied the Katia Oasis and advanced against Romani with one column, while two other columns led by traitorous Bedouins, who had access to our lines, attempted to turn the right flank of the position by seizing high ground southwest of Romani, not far from the Pelusium station on the military railway. Here, after a stiff fight, they were driven off and counter attacked by the Anzac Mounted Division.

Early on the morning of the 4th the N.Z.M.R. Brigade in camp seven miles east of Kantara, moved out towards Dueidar and by midday was attacking near Mt. Royston, about four miles east of Pelusium railway station. The Mobile Section of the New Zealand Mounted Field Ambulance, under Lieut.-Col. Hand Newton, following the Brigade opened a dressing station at Canterbury Ridge, a mile from the railway line, and evacuated their wounded to Anzac Siding, north-west of Pelusium. The following day the bearers and transport for wounded pushed on with the advancing New Zealand Brigade who were attacking the Turks at Katia. The Tent Subdivision did not get up until 5.30 p.m. when they opened a dressing station and received wounded. During this fight we lost one of our medical officers: Captain Wood, N.Z.M.C., R.M.O. to the Wellington Regiment, who with his medical orderly was dressing wounded close up to the south-western edge of the date palms of Katia. Both the medical officer and the orderly were mortally wounded and died shortly after the action, which was broken off at nightfall. The Mobile Section moved back to Et Maler, near Romani, arriving at 6.30 a.m. on the 7th with exhausted horses; they handed over their wounded to the 2nd Australian Light Horse Field Ambulance who formed a divisional receiving station. That same day the Immobile Section of the New Zealand Mounted Field Ambulance, under Major M. Holmes, N.Z.M.C. was ordered up to the 47 Kilometre peg on the railway near Katia, where they had orders to form a divisional collecting station.

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On the 6th, 7th and 8th of August, their rear guards offering a stubborn resistance but losing many men and much material, the Turks fell back until they reached Bir el Abd, some 20 miles from Romani: here they seemed to be in strength and determined to make a stand. The Anzac Mounted Division attacked Bir el Abd on the 9th and a severe engagement followed. The New Zealand Mounted Rifles in the centre of the Battle line were counter-attacked by very strong bodies but held their ground in a somewhat critical position until they withdrew at nightfall. There were many wounded in the Canterbury Mounted Rifles which the R.M.O., Captain Orbell, N.Z.M.C., had much difficulty in extricating under heavy fire. The Mobile Section had followed on and during the day had established a dressing station three miles behind the firing line on the caravan route at a date plantation known as Hod Ed Debabis, where they collected wounded, evacuating serious cases to the 47 kilometre peg and the lightly wounded to Ogratina. During the action the ambulance was bombed by aeroplanes, losing 5 N.C.O.'s and men wounded, and several horses killed. At night when the action was broken off they moved back five miles to Ogratina, where the remaining wounded were taken over by an ambulance convoy. During these operations they had cleared in all 141 wounded. On the 10th the Mobile Section moved forward to Hod el Debabis, while the Immobile Section dealt with 167 wounded which were evacuated by train via Romani to el Kantara. The Turks were retiring on the 12th, and it was determined that the Anzac Mounted Division should hold the country as far east as Bir el Abd, as transport difficulties precluded an immediate advance. The enemy had lost so heavily that he was unable to continue his daring enterprise, and all danger of a further invasion of Egypt was definitely averted.

The experience gained by the medical service was discussed in conference of ambulance commanders: many important imperfections in the organisation of the medical formations for desert warfare were brought to light and amended as far as was possible. The most salient points were these:— Owing to the fact that the regimental Maltese carts could not be used there was so much difficulty in transporting the regulation pattern stretchers that they never reached the firing line— improvised stretchers made of blankets and rifles had to be used, but were a poor substitute. The regimental stretcher bearers, being armed with a rifle, were compelled either to abandon their weapon or experienced much inconvenience from carrying it

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slung while transporting wounded. Sufficient attention had not been devoted to the training of these details, who, as often as not, were to be found in the firing line with their squadron so leaving the evacuation of wounded to volunteers or unauthorised persons. S.B. armlets were in some regiments non-existent. Another matter related to the regimental medical detachment that needed attention was the necessity for an independent channel for communication with the ambulance commander. Messages from many sources demanding sand carts for wounded reached the dressing station and served to dissipate the limited transport of the Mobile Section. The cacolet camels, being slow, and presenting a very large target, were not suitable for work in the open near the front line, but sledges were found to be very useful for this purpose. Sand carts were never to be had in sufficient numbers and it seemed that at least 10 would be the minimal requirement of a Mobile Section. Ultimately after a close consideration of all factors, it was decided to procure for the regimental stretcher bearers a light bamboo stretcher which could be conveniently carried on horseback. Regiments were advised to see to the training and proper employment of their stretcher bearers in action. All demands from regiments to ambulance for transport for wounded were to come by mounted bearer from the R.M.O. only, to the commander of the bearer personnel, or the officer commanding the Mobile Section. Sand carts to the number of 12 per ambulance were demanded, but it was never found possible to supply so large a number of these indispensible vehicles. Medical equipment taken form the Turks showed a high grade of efficiency, and more especially the Turkish pattern cacolet for stretcher cases was found to be much superior to our own. But in general the use of cacolets was limited as the wounded travelled very uncomfortably in this means of conveyance. A sledge constructed by the New Zealand Mounted Field Ambulance with broad four-inch runners was demonstrated to be preferable to a cacolet for handling serious lying down patients, more especially in close proximity to the firing line.

The months of September, October, and November were a period of outpost duty, rest, training and organisation. Sanitary effort was not neglected, although the sickness wastage rate of the Mounted Division would have been considered very high on the Western Front, as it averaged from 12 to 14 per 1000 per week. There had been a mild outbreak of cholera following the advance in August: the disease was prevalent amongst the

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Turkish troops as we learnt from notices to that effect left by the enemy near the wells at Bir el Abd. The Immobile Section of the New Zealand Mounted Field Ambulance, which moved forward about this time to the 57 kilometre peg, had a bacteriological laboratory attached under Lieut.-Col. Martin, A.A.M.C., late of Lemnos, by whom both the cholera, dysentery and diphtheria epidemics were investigated in an isolation hospital established for the purpose. A mobile laboratory attached to a mounted division is a necessity in the sub-tropics, and the Anzac Field Laboratory thus constituted remained during the campaign in close touch with the Division. The earliest cases of malaria were noticed in the autumn and were traceable to infections arising at el Kantara. With the granting of leave for short periods to Alexandria and Port Said there was an increase in venereal disease. A sanitary section had been authorised for the Anzac Mounted Division in August and was now beginning to make its weight felt by providing sanitary apparatus for the regiments and supervising the bathing and disinfestation stations; a very necessary precaution as a few cases of relapsing fever had been reported. "Pinking" of wells or their chlorination and placarding of suitable water supplies were some of the more important duties during the cholera outbreak.

During this period of waiting for the railway to come forward—it was moving at the rate of a mile a day—no military operations of importance took place, but in November railway construction had advanced so far that plans for the capture of el Arish were under discussion. It was not until December the 20th, however, that the town, completely surrounded by the Division, was found to be abandoned by the enemy, who had offered no resistance. It was otherwise in 1799: Napoleon, who had arrived in front of el Arish on the 17th of February—he had ridden or driven up from Cairo in seven days—found a very lively siege in hand, and one of his divisions under Reynier fighting a pitched battle on the east bank of the wadi in order to disperse the Turkish relief columns coming down from Gaza. The fort at el Arish fell into his hands on the 20th, and on the 25th he was in Gaza; it was but a little more than three weeks since his columns had moved out from Salahia!

Our Turks had retired to Magdhaba where, on the 23rd, they were to be attacked by the Division. Sir Philip Chetwoode, who arrived by motor launch and had landed on the beach at el Arish, now took command of the whole force of cavalry and camelry of which the Desert Column was formed and issued

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orders for the battle. The New Zealand Mounted Rifle Brigade was in bivouac two miles south-east of el Arish on the afternoon of the 22nd. The Mobile Ambulance Section moved out at 6 p.m., the bearer personnel keeping pace with the regiments, the Tent Subdivision following in rear with the slower moving camels under the escort of a troop of the Auckland Mounted Rifles. All had rendezvous at a point in the dry bed of the wadi el Arish where a halt was made; and later the night march to Magdhaba was resumed, the distance from el Arish being 30 miles. The column arrived before daybreak and at 8 a.m. on the 23rd a dressing station was opened by Lieut.-Col. Hand Newton, N.Z.M.C., some three miles west of Magdhaba, the bearer personnel following the New Zealand Mounted Rifle Brigade into action.

The battle opened at 10 a.m., the New Zealand troops attacking from the north-east. The bearer personnel took up a position near brigade headquarters on some high ground overlooking the town and from there sent forward sand carts, sledges, and bearers to the collecting posts, formed by the R.M.O.'s. The Turkish Garrison, although completely invested by the Anzac Cavalry, and the Camelry, held out in their redoubts with well directed machine-gun fire and a battery of mountain guns to assist them, until approaching evening warned the besiegers that no water could be obtained until they entered Magdhaba and that the place must be carried by storm before nightfall. A bayonet charge settled the matter; the Turks surrendered by 4.30 p.m. and at dusk, our horses were watering at the captured wells. There had been few casualties at the dressing station up to 2 p.m., but by four o'clock large numbers of wounded were coming in as the result of the final assault. Many of the wounded, both Turkish and British, were brought into the well equipped Turkish Field Hospital at Magdhaba, and as they could not be cleared that night, remained there until the 24th in charge of the 3rd Light Horse Field Ambulance, some R.M.O.'s and the D.A.D.M.S., Captain Hercus, N.Z.M.C., who was in charge of medical arrangements. The main force retired to el Arish that night leaving two cavalry regiments to protect the wounded. The New Zealand Mounted Field Ambulance had a brisk twelve hours work, as they did not get in all their wounded until 3 a.m. on the 24th; they tended 15 officers and 153 O.R.. Their first convoy comprising 9 sand carts, 3 sledges, 1 captured Turkish buggy and cacolet camels, left at midday on the 24th, and the whole Ambulance Mobile Section cleared the dressing station

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site with the more seriously wounded at 1 p.m. The night that followed was very cold; the wounded in the cacolets suffered severely, the cacolets were constantly breaking down. Two of the lying cases died during the night march. Very early on Christmas morning, about three miles from el Arish, the ambulance, now almost at the point of exhaustion, was met by a convoy of the 52nd Division with sandcarts, to which all the cacolet cases were transferred, and by 4 a.m. the New Zealand Mounted Field Ambulance had handed over their wounded to the receiving station on the beach. In all they had handled some 168 wounded, 37 being New Zealanders, while the Turkish wounded brought in by them numbered 5 officers, 55 O.R. The wounded were to have been evacuated by sea from el Arish but rough weather and heavy seas prevented, so that on the 28th a large convoy was formed at el Arish and carried the wounded in sand carts or sledges to the 139 kilometre peg, where a hospital train awaited them. The New Zealand Brigade and the ambulance moved down to the beach to a very pleasant camp, where the "multitudinous laughter of the sea" was a delight for tired men and horses. At the end of the year Major M. Holmes, N.Z.M.C., went to England on duty, and as we have seen took over command of No. 1 New Zealand Field Ambulance in France.

In the new year the invasion of Palestine was decided upon and preparations for the execution of this war policy were on foot. On the 8th of January, 1917, the Desert Column was concentrated at el Arish for a raid on Rafa, the first outpost on the Turkish frontier. In this dashing cavalry exploit five mounted brigades were employed; 2 Australian Light Horse Brigades, the New Zealand, the 5th Yeomanry, and the Camel Brigade. The medical troops comprised a mounted field ambulance mobile section for each brigade, and two ambulance convoys, the desert equivalent of an M.A.C. Each ambulance convoy had 2 officers, 20 O.R., 16 A.S.C., 68 native drivers, 74 camels, 8 sandcarts, and was capable of transporting 126 patients of which 46 lying down. The distance to be covered from el Arish to Rafa was over 30 miles, in part through desert, partly on formed tracks beyond Sheik Zowaiid, a halfway halting place. Railhead, where hospital trains could load wounded, was now up abreast of el Arish where the field ambulances of the 52nd Division formed receiving stations, the equivalent of main dressing stations or C.C.S.'s.

At 4 p.m. on the 8th the Desert Column was set in motion and forded the wadi el Arish, the old frontier of Egypt, now a

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rustling yellow stream that partly filled the wide shingle bed and beyond the bar streaked the blue of the sea with saffron bands. The ambulances marched behind the ammunition camels; their pace limited to two and a half miles an hour. That night they bivouacked near Sheik Zowaiid, 15 miles from Rafa, in cultivated land traversed by hard mud tracks suitable for wheeled or even motor transport. One tent subdivision of the 1st Light Horse Field Ambulance, the two ambulance convoys, and a detail of the Divisional Sanitary Section for water purification duties, remained to form a receiving station at Sheik Zowaiid, but the Mobile Sections detaching the bearer personnel and transport to the brigades moved on with the column.

At 1 a.m. on the 9th, the march was resumed along the Darb el Sultaniyeh—the Way of the Kings—the beaten track of all the armies of the ages. As the sun came up the enemy was found strongly posted on a smooth green hill, its sides scarred by trenches and on its crown a redoubt of very formidable appearance. The cavalry brigades closing in from all sides—the New Zealanders from the north galloping through the village—dismounted and encircled the hill with a ring of well nourished fire from machine-guns and rifles. The battle was fully engaged by 11 a.m. The New Zealand Mounted Field Ambulance Tent Subdivision had opened a dressing station near Divisional Headquarters at Shokh el Sufi, about four and a half miles south-east of Rafa, while the bearer divisions had formed a collecting post on a road leading from the north, at a spot about two miles from the New Zealand firing line near General Chaytor's headquarters. Owing to the very open nature of the hillside and the absence of cover, the sand carts could not be brought up as far as the R.A.P.'s, so that most of the evacuations had to be by hand and in this work the light bamboo stretchers proved their worth. Very few wounded had reached the Tent Subdivision by 2 p.m., but after this hour the flow became increased. The first convoy of lightly wounded left the New Zealand Mounted Field Ambulance early in the forenoon for Shiek Zowaiid. The battle dragged as the afternoon wore on, the position was so strong and so well defended that it seemed that we must be held up until nightfall, before the final assault could be made. Already a regiment of Turkish infantry was on its way from Khan Yunus to relieve the two battalions at Rafa. The position was indeed critical when, at 3.30 p.m., Sir Philip Chetwoode gave orders for a concentration of all available artillery on the redoubt and a general assault. As no visible results followed this order, retire-

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ment was inevitable as large forces of Turks were seen approaching from Shellal. There was a moment of tense anxiety. A partial retirement was in progress, but suddenly all was redeemed by a sparkle of New Zealand bayonets on the hill-top, and after a while, the garrison, over 1500 in number, surrendered. But a speedy withdrawal was necessary. Above all, the wounded still lying out must be collected and brought in, and before the final phase of the battle, the sand carts moving boldly out into the open under their red cross flags, collected the wounded unhampered by fire from the still occupied trenches and without casualties to bearers or horses. At 5 p.m. the Tent Subdivision of the New Zealand Mounted Field Ambulance had orders to close, pack up and stand by. All the patients and the equipment were loaded upon the camels and word was sent to the bearer division to expedite the work of clearing their wounded. At 5.30 p.m. the battle was over; the Tent Subdivision closed at 6 p.m. and joined the main body now withdrawing to Sheik Zowaiid. But the Bearer Division remained behind searching for wounded in the dark. At 10 p.m. they were assured by a staff officer that all the New Zealand wounded were in, but they still persisted in their efforts until, at 1.30 a.m. on the 10th the last of their sand carts left the battle field. In all the New Zealand Mounted Field Ambulance had collected 7 officers, 60 O.R. The total wounded brought in by the column was 27 officers, 385 O.R. including 162 Turkish wounded. At Sheik Zowaiid the wounded remained through the night in the tent subdivisions, but owing to a lack of transport there was some shortage of blankets, rations, comforts and dressings. Small supplies of the last two necessaries came forward on the 10th by aeroplane. It was not until 5 p.m. that day that the last of the wounded were brought off by the convoys. During the day some medical personnel and burial parties remained on Rafa Hill covered by strong rear guards. Although the armed Amalekites prowled, like hyenas in search of prey about the newly dug graves, the Turks did not advance to investigate the situation more closely, but remained on their outpost lines some four miles away. On the 12th all our wounded were put aboard a hospital train at the 152 kilometre peg. The New Zealand Mounted Field Ambulance returned to camp at Massaid, where they remained for over a month resting, training, and reorganising.

The desert had now been left behind; the wanderings in the wilderness had ceased. To our nomads, now over a year in the desert, the spring time luxuriance of the plains of Philistia seemed

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indeed a thing of promise. The lustrous green of the barley fields gemmed with scarlet anemones and purple irids gave new hope to man, and the horses whinnied with delight as they pranced girth high in verdure. Thoughts of adequate wheeled transport filled the mind of the medical troops: beyond were roads fit even for motor ambulance cars, wheeled transport of European type was required urgently, as at present they had neither ambulance waggons. G. S. waggons, water carts, nor motor ambulance cars.

By the end of March railhead had reached Rafa; preparations were forward for the capture of Gaza. On the 23rd a conference of field ambulance commanders was held for the purpose of discussing the oncoming operations. The task set for the cavalry was to envelop the city from the north and north-east, and on the 25th, the three mobile sections, less camel transport, were moving with the Anzac Mounted Division across the Wadi el Ghuzze to Beit Durdeis some four miles north-east of Gaza. At 2.30 a.m. on the eve of the first battle of Gaza, the New Zealand Mounted Field Ambulance Mobile Section, less the Tent Subdivision and Camel Transport, accompanied the New Zealand Mounted Rifle Brigade to Deir el Belah on the high road to Gaza, three miles south of the Wadi el Ghuzze, where they went into bivouac. Starting at 2.30 a.m. on the following morning, the 26th of March, a twelve mile trek via Tel el Ahmar, four miles due south of Gaza, brought the column to Tel el Humra in the vicinity of Beit Durdeis, where the Anzac Mounted Division were now in position to strike from the north and the north-east. South of Gaza the Infantry of the 53rd Division failed to get home in their frontal attack. Their losses were heavy; they made little headway. It was now the turn of the Anzac Division, and by 3 p.m. the New Zealand Mounted Rifles were trotting out, under a desultory shell fire, to el Masrah, a little more than a mile due north of Gaza, where they dismounted for action, with the 2nd Australian Light Horse on their right pushing down from the north. Each New Zealand regiment as it dismounted was accompanied by one sand cart, but the main transport park of the Mobile Section remained under cover of a steep bluff close by brigade headquarters.

As the New Zealand Mounted Rifles fought their way through the northern outskirts of the town, close touch with the R.M.O.'s was maintained by the N.Z.M.C. bearers, and casualties were collected within a few minutes of their reaching the aid posts. There was good cover from huts and tall hedges of prickly pear.

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As the afternoon wore on, and our men penetrated further into the suburbs the whole ambulance transport was pushed up as close to the firing line as cover permitted. The Tent Subdivisions and the Camel Transport did not reach Beit Durdeis until late in the afternoon. Lieut.-Col. Hand Newton opened his tent subdivision north of Gaza where he admitted wounded until 10.30 p.m. when he was ordered to withdraw to the west bank of the Wadi el Ghuzze.

When dark came and the fighting died down the Mobile Section had orders to withdraw, but no move was made until the last of the sand carts came in and word had been received from the R.M.O.'s that all was clear. The transport available was barely sufficient to accommodate the 6 officers and 28 O.R. wounded, of which all but three were New Zalanders. No Turkish wounded were carried away, they were made as comfortable as possible with a first field dressing and left where they fell. On arrival at the concentration point ordered for the Anzac Mounted Division an endeavour was made to feed and dress the more seriously wounded, but at 11 p.m. came the order to march, and the New Zealand mounted field ambulance sections, carrying their wounded with extreme difficulty in the crowded carts, in inky darkness, retired with the brigade to el Belah, 15 miles back, where, after a very trying journey, the patients were handed over to the 1st Welsh Field Ambulance at 7.30 a.m. on the 27th, and were transferred to the 54th C.C.S. at Kahn Yunus on the day following.

At the second attempt to take Gaza, the Australian and the New Zealand Mounted Divisions were assigned the duties of watching the road to Beersheba and engaging Turkish reinforcements that might be marching from the latter direction to the assistance of Gaza. The Mobile Section left its bivouac by the sea shore near el Belah on April 16th and forded the Wadi el Ghuzze with the New Zealand Mounted Rifle Brigade near Shellal where the Tent Subdivision established a dressing station. The transport of the mounted ambulances had by this time been augmented by two limbered waggons, which served to carry the Tent Subdivision equipment; six sand carts still filled the duties of ambulance waggons; camels and cacolets were discredited as they had proved far too slow and too primitive for mobile ambulance work in Palestine. On the 19th the New Zealand Mounted Field Ambulance moved up to a point on the west bank of the Wadi Imleh about four miles south of Abu Hareira, where the New Zealand Mounted Rifles went into action. A

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dressing station was opened at 2 p.m. receiving, in all, 5 officers, 78 O.R., including 1 New Zealand Medical Corps bearer wounded. Frequently the dressing station was bombed by the Turks who seemed for the time to have a complete mastery of the air. At 4.30 p.m. the Tent Subdivision was cleared by light motor ambulance cars coming up by road from Tel el Jemmi, to which place, after the disastrous action, the Mobile Section returned at night with its brigade. A confused night of intense darkness, the Khamsin blowing; the troops disheartened by lack of success; horses and men exhausted.

During the hot summer months the operations stagnated. The failure at Gaza and the establishment by the Turks of an entrenched line over 20 miles long to Beersheba limited the movements of the Desert Column to a war of outposts, trench digging, reconnaissance and patrolling, more especially in the direction of the open flank to the eastwards. Early in May an Anzac Rest Station was formed by the Immobile Section of the New Zealand Mounted Field Ambulance at el Marakeb, on the beach, opposite Kahn Yunus. While acting as a receiving station at el Belah this Immobile Section had suffered severely from aeroplane raids, having 2 N.Z.M.C. O.R. killed, and 9 wounded besides losing horses on the 4th and again on the 9th of May. Major Trotter, N.Z.M.C., at this time commanding the section, with assistance from the Red Cross Society, organised a very pleasant tented camp where sea bathing and an improved dietary did much to restore the vigour and spirits of jaded Anzac convalescents who arrived daily by cacolet camels from their respective ambulances for a ten days rest.

All through this long period of summer heat the troopers suffered much from sickness, and the weekly wastage rose to over 20 per 1000. Sanitary effort was not neglected and with the cheerful co-operation of our old friends, Majors Le Lean and Austin, every effort was made by Major Harvey Sutton and the Anzac Sanitary Section to maintain field sanitation at as high a level as possible. A determined war was waged against dust, bad water, flies, lice, and the anophelines, and especially against boredom and the weariness of the spirit begotten in men remote from the amenities of home life, even of civilisation, and who had no opportunities of getting leave nor any change from the dreadful monotony of the East. Periods of rest in June and September during which bivouacs were established by the sea, and recreation provided, did something to relieve the war weary veterans of the Sinai Campaign. With the cooler nights of October

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and the early rains the health of the troops improved and the prospects of an imminent move to a decisive action cheered the whole Desert Column.

Important administrative changes had come about. The Desert Column was now included in the "East Force" under Sir Philip Chetwoode's command, and with the formation of other mounted divisions became the Desert Mounted Corps of four divisions under the command of General Chauvel. Command of the Anzac Division, comprising the 1st and 2nd Australian Light Horse and the New Zealand Mounted Rifle Brigades passed to Major General Chaytor, C.B., D.S.O. Colonel Downes, A.A.M.C. became D.D.M.S. of the Desert Corps, while his late appointment was filled by Lieut.-Col. Croll, A.A.M.C., who became A.D.M.S. of the Anzac Division with Major Hercus, N.Z.M.C., as D.A.D.M.S. The organisation and transport of the mounted ambulances had been somewhat remodelled; the mobile sections had now 1 G.S. waggon each, with 3 limbered waggons in which to carry their tents and equipment. Camel transport was no longer used but riding camels were provided for personnel. The sand carts, 12 in number, still represented the ambulance waggons; there was one water cart, and it was hoped to be able to attach one light motor ambulance car to each of the three ambulances of the Anzac Division. Cycle or wheeled stretchers capable of being adapted to horse traction had been issued, in limited numbers, but proved unserviceable and were shortly withdrawn.

After a period of rest on the beach at Marakeb where men and horses took on renewed spirits and vigour, the Division closing its rest camp in the last week of October, was on the move for a magnificent cavarly drive against the Turkish left flank at Beersheba. East Force was on "Z" day to envelop and seize Beersheba; the 60th Infantry Division attacking frontally while the cavalry by a wide encircling movement, were to cut the railway to Jerusalem and envelop the Turks from the East. The medical arrangements were these:—the mobile sections would, as usual, accompany their brigades. To the New Zealand Mounted Field Ambulance Tent Sub-Division was given the task of forming a divisional collecting station near Iswaiwin about six miles by road south east of Beersheba, while the A.D.M.S. proposed to hold one tent subdivision, that of the 1st Australian Light Horse Field Ambulance, in reserve. If all went well the divisional collecting station was to move into Beersheba when evacuated by the enemy. At Asluj, some 16 miles south of Beersheba, the three immobile sections of the Anzac ambulances were to form

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a corps collecting station under the control of the D.D.M.S., a sort of C.C.S. in fact, where a certain amount of urgent operative surgery could be performed by officers specially qualified. From the divisional collecting station to the corps station evacuations would be by road with light motor ambulances.

Leaving their point of departure near Kahn Yunus, a two days' march of about 30 miles, during which water was very scarce, brought the N.Z.M.R. Brigade and the New Zealand Mobile Section to Asluj, a station on the Turkish military railway which accompanied the road from Beersheba to el Auja on the Sinai frontier. Here a halt was made on the 29th. On the night of the 30th the march was resumed in brilliant moonlight, and by 7 a.m. on the 31st the Anzac Mounted Division was assembled on high ground near Iswaiwin and Khasm Zanna overlooking their objective, the Tel el Saba and the low lying ground to the west, where the mosque of Beersheba could be seen dominating the town.

At 9 a.m. the advance of the N.Z.M.R. began—their objective Tel el Saba, the key of the Turkish position—while the 2nd Australian Light Horse Brigade on their right were directed upon Tel el Sakati about six miles out to the north-east of Beersheba on the Hebron Road. Divisional Headquarters remained at Khasm Zanna, three miles from Tel el Saba and about five miles from Beersheba. It was close to this point that the Tent Subdivision of the N.Z.M.F.A. established the divisional collecting station at 12.40 p.m. The bearer personnel and transport had gone forward with the firing line. The road that came from the Turkish positions in the town and went south-east in the direction of Asluj was in good condition and practicable for light motor ambulance cars so that the work of the bearer personnel was much assisted by pushing the motor ambulances to a car post a mile forward of the divisional collecting station. Throughout the action close touch was maintained by the bearers with the R.M.O.'s and at no time was there any shortage of sand carts to clear the R.A.P.'s.

At a little after 2 p.m. the Auckland Mounted Rifles took a trench line on the eastern face of Tel el Saba and the main position was rushed at 3 p.m. Shortly after this the 1st A.L.H. Brigade and the Australian Mounted Division galloped in a dashing charge over the trenches south-east of the town and Beersheba and its remaining garrison fell into our hands.

During the day the motor ambulances had carried wounded to the corps receiving station at Asluj which by 7 p.m. was full.

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The Anzac divisional collecting station was also full so that casualties had to be collected by the Tent Subdivision of the 1st A.L.H.F.A. on a road midway between Asluj and Beersheba. As shelter could not be provided for all the wounded in the N.Z.M.F.A. Tent Subdivision, an overflow was directed to a dressing station formed by the 5th A.L.H.F.A. close by, and as the road to Beersheba was not yet open, the wounded had to remain in the divisional collecting station during the night. By midnight the N.Z.M.C. personnel had fed and dressed the remaining patients and, as their equipment included 120 blankets and the night was cold, all were made as warm as possible in improvised shelters.

At 6 a.m. on the 1st of November two enemy aircraft descending to 1200 feet bombarded the area occupied by the N.Z.M.F.A. still open for wounded, and although red cross flags were prominently displayed, and there were no fighting troops within two miles, yet the aircraft, after expending their bombs, sprayed the encampment with machine-gun fire; it seemed deliberately. Bullets and bomb fragments penetrated the tents and bivouacs, tore even the red cross flags, but, by strange providence, the only casualties were one wounded again hit, and one mule killed. At 2 p.m. that afternoon all patients were cleared by motor ambulance to Beersheba and the Mobile Section, reunited, joined the Brigade at Tel el Saba. The Tent Subdivision had dealt with a total of 60 wounded and 13 sick during the operation, the total casualties of the Anzac Division being 15 officers, 150 O.R. The water supply throughout the action was extremely limited and, but for a thunderstorm on the night of the 29th, which filled some water holes, the wounded would have fared badly.

But more serious fighting was to follow. From the 1st November onwards the infantry fight was continued in the attempt to break the Turkish line to the west of Beersheba during which period the Anzac Mounted Division and the 54th Division were engaged in protecting the right flank to the north and east of the town, a portion of our line subjected to heavy Turkish counter attacks. The N.Z.M.R. Brigade was in action on the 4th, 5th and 6th near Tel el Khuweilfeh, some eleven miles due north of Beersheba, close to a good military road used by the Turks in their retreat and where they now fought a stern rearguard action and delivered many counter attacks. On the 4th November, the N.Z.M.F.A. had orders to proceed to Mikreh, about two and a half miles south of Tel el Khuweilfeh

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where they were to relieve the 5th Yeomanry Brigade Ambulance and were to form a divisional collecting post. As the road north was under observation and heavily shelled during the day, the bearer personnel moving up to the Brigade Area brought with them blankets, extra dressings and medical comforts for the purpose of establishing an A.D.S. where the wounded could be sheltered during the day, pending evacuation along the exposed road under the cover of night. Major Trotter, N.Z.M.C., in charge of the bearer personnel pushed on along the road to a point giving good cover near the head of a dry water course, not far from brigade headquarters. Above them the Canterbury Mounted Rifles were holding a line on Ras en Ngab. Sand carts could with difficulty be brought so far forward as the country was very rough. The Canterbury firing line was still some considerable distance beyond the A.D.S. Wounded came in continuously to the N.Z.M.F.A. divisional collecting station during the night, and when fed and dressed were evacuated by motor ambulance cars to an Anzac receiving station four and a half miles south on the Hebron road. Some 70 casualties were thus evacuated.

The night had passed quietly at the A.D.S. but at dawn casualties came in. One sandcart went down early to the Tent Subdivision passing over the road which was shelled at intervals and was in places open to machine gun fire, and as the journey was completed without mishap, the sand carts continued to evacuate the forward positions during the day. Some lightly wounded from the firing line came down to the A.D.S. on horseback, but the stretcher cases could not be evacuated until nightfall as the position was very exposed. As the brigade was to be relieved that night all the bearer personnel came in with the stretcher cases, reaching the Tent Subdivision about midnight. The Camel Brigade Field Ambulance which was to take over, had opened at 5 p.m. and helped with the work of the divisional collecting station. But in the morning it was found that the N.Z.M.R. Brigade had not been relieved through the night so that the whole of the bearer personnel was obliged to return to the A.D.S., at about 10 a.m. In the afternoon the Brigade was relieved by the Imperial Camel Corps and all went back to bivouacs near Mikreh, the horses going 10 miles into Beersheba for water. During this action the N.Z.M.F.A. dealt with 133 wounded and 36 sick. Of the wounded, 5 officers and 64 O.R. were of the New Zealand Brigade

On the night of the 6th the infantry divisions broke the line west of Beersheba and at dawn on the 7th, the Anzac

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Mounted Division, less the N.Z.M.R. Brigade, with the Australian Mounted Division dashed through to the rear of the Turkish positions making north-west for the railway line to Jerusalem at Ameidat. The Turks hurried out of Gaza that night and on the 8th were in retreat; their whole line was crumbling. On went the cavalry without much water and with little feed for their horses, till they reached Ashdod on the 10th and handed over to the 52nd Division coming up from Gaza on the extreme left of the British line. The exhausted horses, weak from want of water, were brought to the bounteous wells at Hamame a few miles north of Ascalon; at this time the N.Z.M.R. Brigade joined the Division.

On the 11th of October the N.Z.M.R. Brigade left Beersheba on its forced march of 56 miles through Sheria, Huj and Burcia arriving at Hamame on the 12th at 10 p.m., where it rejoined the Division. The weather was hot and oppressive, water was very scarce on the march, but supplies did not fail as "B. Echelon" the improvised divisional train arrived on the same day.

On the 14th the Division while pushing north encountered stiff opposition after crossing the Wadi Rubin. The Turks in superior numbers held a strong position on ridges covering the road to Jaffa. At noon the A.D.M.S. instructed the N.Z.M.F.A. to open a divisional collecting station at el Kubiebeh three miles north of Yebna. At 1.30 the N.Z.M.R. Brigade was engaged at Ayun Kara and was meeting strong resistance; an hour later wounded were coming in to the Tent Subdivision opened near the mosque in el Kubiebeh. The bearer personnel had found a covered position about one mile further north. During a very determined counter attack on the left of the Brigade there were heavy casualties on our side, but the attack was beaten off and the position secured by 4 p.m. Following this the collecting station rapidly became congested; the wounded were fed, dressed, given A.T.S., and accommodated in improvised shelters. At 8 p.m. the 1st A.L.H. Field Ambulance was ordered up to open at Kubiebeh so as to relieve the N.Z.M.F.A. and from this time onwards all further wounded brought in were directed to the relieving Tent Subdivision. At 10 p.m. Lieut.-Col. Hand Newton evacuated 69 lightly wounded by means of the returning brigade supply waggons, but the bearer personnel, on account of darkness and rough country, could not clear the battlefield of New Zealand wounded until after midnight. Early the next morning our sand carts brought in some seriously wounded Turks and in the

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afternoon the motor ambulances were evacuating the dressing stations to Yebna. During this sharp engagement the losses of the Brigade—mainly in two regiments only, Auckland and Wellington —amounted to 44 killed, 81 wounded, nearly 18 per cent. of casualties amongst the 700 rifles actually engaged, and the proportion of killed to wounded was unusually high. The ambulance collected almost all the New Zealand wounded: 7 officers, and 74 O.R., and with British and Turkish wounded, and including the sick, admitted during the action, 166 patients. The Turks must have lost heavily as many of their wounded were found in rear of the positions on the 10th and many more had been abandoned in the town hall of Richon Le Zion, a Jewish garden settlement just north of the disputed ridges and of which more is to be said later.

A regiment of N.Z.M.R. had entered Jaffa two days after the action at Ayun Kara. Lieut.-Col. Hand Newton was ordered to proceed there on the 17th for the purpose of taking over the French hospital, but the buildings were found to be in such an unsavoury condition, due to a hurried withdrawal of the Turks, that after herculean efforts, the small staff of the Tent Subdivision—the bearers being still with the Brigade—found it impossible to cleanse the wards satisfactorily. The mattresses were heavily infested with bed bugs, mosquitoes extraordinarily prevalent, and the sanitary offices and water supply were in a dangerous condition of neglect and disrepair. In fact, as some wit suggested, the hospital seemed to have remaind unopened since the retreat of the French Syrian Force from Jaffa on May 27th, 1799, on which day the army surgeon, Desgenettes, indignantly repudiated Napoleon's suggestion that the 60 moribund sick, about to be abandoned, should be granted euthanasia by an overdose of opium. Lieut.-Col. Hand Newton reported to the A.D.M.S. that the French hospital was unfit for occupation and on the 20th, General Chaytor, whose headquarters were now in Jaffa, arranged for the Mounted Field Ambulance to take over a portion of the Jewish college as a garrison hospital.

An operation by the N.Z.M.R. resulting in many casualties was carried out on the 24th and 25th of November. The Brigade crossed the Auja river north of Jaffa, seizing bridge heads and leaving three squadrons supported by infantry north of the river to secure the ford and the bridge at Hadrah. The Turks responded by a counter attack in force, which drove our outposts back over the disputed river crossings. The N.Z.M.F.A. Bearer Section with transport was at 8 a.m. on the 25th close to the

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bridge where they formed a collecting station. The sandcarts although in full view of the enemy were permitted to collect wounded unmolested, and casualties of which 39 New Zealanders were brought in and evacuated to the Anzac Receiving station at Ramleh by camels and motor ambulances. This closed the active operations for the year and in December the Immobile Section coming in from Ramleh, the whole N.Z.M.F.A. was in rest at Esdud where they spent a cold, wet and wintry Christmas Day. Until late in February, 1918, no movements of importance are recorded, and during this time the Brigade and its ambulance rested, refitted, and reorganised in the vicinity of Esdud and Richon. Command of the ambulance was relinquished in December by Lieut.Col. Hand Newton, D.S.O., who was proceeding to France to take over the New Zealand Stationary Hospital; in his absence Major Trotter, N.Z.M.C., temporarily commanded until the arrival of Lieut.-Col. R. H. Walton, N.Z.M.C., late D.A.D.M.S. of the New Zealand Division.

During the period of rest in January the troops, were in tented camps; about them were pleasant garden villages, embowered in trees and set about with vineyards and orchards, where the orange throve and the almond flourished: Jewish colonies founded now for many years under the Zionist movement. Here, there were white people, some who spoke English, as they had come, some from America, some even from Australia and New Zealand. In these pleasant and gracious surroundings the sickly troops renewed their health by recreational training and release from monotony. Of all the villages Richon Le Zion close to Ayun Kara, was the most treasured by the New Zealanders; here General Chaytor had his headquarters; and here the Municipal Washhouse—the town had been planned on the most modern lines—made a famous divisional baths so that with the aid of wine vats and large boilers a weekly hot bath could be given to the whole force. Disinfestation of clothing from lice was a pressing problem. A mild type of relapsing fever was not uncommonly seen in Anzac troops and typhus was known to be endemic in the Turkish Army. Owing to the very infrequent visits of the train disinfesting plant to railhead, the only means available were the brushing of the seams of the clothing and the wholly futile use of N.C.I. or "Oxford" louse powder which served, not at all as a deterrent, but rather as a relish to the parasite in his blood feasting. A small hot air disinfesting plant, taken by our Division from the Turks at Ramleh, was much appreciated, but the

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need of a Thresh disinfestor was stressed by the divisional sanitary officer. At Richon a great parade of sanitary perfection and the forgotten laws of Moses, again recited to the Elders by the Anzac D.A.D.M.S. and sternly enforced by the commander of the sanitary section, Major Harvey Sutton, A.A.M.C.

After the fall of Jerusalem plans for the 1918 operations were maturing. Reorganisation of the mounted ambulance transport—the never to be settled question—was again considered. In February the new transport equipment was issued, not without vigorous protest from the Anzacs. Under their old establishment each mounted ambulance had 12 sandcarts, 20 cacolet camels, and, recently, 4 light motor ambulances; all of which provided transport for 40 lying and 38 sitting cases. Under the new orders the sand carts were to be replaced by 6 light horsed ambulance waggons; the cacolet camels and the riding camels for the tent personnel were to be withdrawn. This readjustment it was urged, imparied both the mobility and the carrying capacity of the ambulances. The sand cart, however defective in construction, had much to recommend it:—it was two wheeled and much handier that the light ambulance waggon; it carried three lying cases with ease as opposed to two; it could be hauled empty by two horses in any country, whereas the waggons required four; and above all, its adaptability to sandy, marshy or rough country, or to muddy roads, and the ease with which it could be manoeuvred quickly across country to the proximity of the firing line made it vastly superior in cavalry operations of a scattered nature. In a word, the ambulances were loath to part with the desert cart, whose worth had been proved in two years of campaigning on all conditions of surfaces, from deep sand to glutinous mud; the broad tyres and the two wheels were the keynotes of its perfection.

Eight months campaigning in the Jordan Valley with two raids into the mountains of Moab, the first a partial, the last a complete success, concluded the operations of the N.Z.M.R. Brigade and its ambulance in the victorious year of 1918. Although Jerusalem had fallen on December the 8th, the Turks still held on to the wilderness about Jericho in the Jordan Valley, less than 20 miles by motor road from the Holy City; and were still using the Dead Sea and a motor road east of Jericho to Es Salt and thence to Amman on the Hedjaz railway for the transport of grain from the southern extremity of Moab. In order to drive the enemy out of Jericho and deny him the use of the Dead Sea near the mouth of the Jordan an expedition was

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organised in February consisting of the 60th London Territorial Division, the 53rd Division and the Anzac Mounted Division.

On the 17th of February, 1918, the New Zealand Mounted Rifle Brigade was concentrated at Bethlehem where the cold wintry weather on the Judean Hills was a sharp change from the pleasant warmth of the maritime plains about Richon which they had left two days before. The New Zealand Mounted Field Ambulance, commanded by Lieut.-Col. Walton, N.Z.M.C., was in camp at Mar Elias, midway between Bethlehem and Jerusalem about two and a half miles from either point. For the purposes of the raid they were permitted to retain four sand carts; otherwise their transport was as laid down in the new establishments; but six baggage and twenty cacolet camels were now added to the transport. The Turkish positions astride the broad motor road leading down from Judea to the Jordan were attacked by the infantry on the 19th near Talaat Ed Dum, ten miles east of Jerusalem, while the Anzac Mounted Brigade, using an ancient track six miles south of the main road endeavoured to outflank the enemy and penetrate to his rear at Jericho. As the track was narrow and very rugged, and permitted the passage of horsemen in single file only, no wheeled transport could accompany the cavalry. The N.Z.M.F.A. with their 26 camels went down by the rough goat track to Ali Muntar, a hill momentarily held by the Turks but soon overrun by the N.Z.M.R., and bivouacked for the night, there were no casualties. The following day the N.Z.M.R. engaged a position covering Neby Musa about six miles south of Jericho. By noon the infantry had cleared the motor road at Talaat ed Dumm and the Turks were falling back on the Jordan. After some sharp fighting the N.Z.M.R. had their way just after midday, went on three miles, but were unable to advance upon Nebi Musa which lay across a deep chasm impassable to horses, and covered by artillery enfilade fire. The ambulance stumbling down the three miles of steep hillside picked up some sick and wounded at the site of the engagement, collected a few more lightly wounded coming in on horseback and settled all down comfortably for the night in tents carried by the camels. That night the 1st L.H. Brigade scrambled down into the depths of the Jordan Valley and reached east of Jericho on the morning of the 21st; but the enemy was now well away to the Jordan, six miles east. Our ambulance had much difficulty in getting down the steep rocky torrent bed, where horses had to be led in many places, and in transporting the sick and wounded in the cacolets. At times the patients had to

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be off loaded and carried by hand over certain critical points in the track and loaded again on the cacolets; a distance of two miles took over six hours to negotiate and the seriously wounded suffered unutterable torment in the swaying cacolets. In the afternoon they entered Jericho and established a dressing station in the Russian hospice, where later on they collected and tended some 11 seriously wounded Turks abandoned in the hotel. The following morning a light motor ambulance convoy coming down from Jerusalem cleared the Tent Subdivision which was now reinforced by two of its light horsed ambulance waggons and one limber which had been sent on from the mounted ambulances transport park at Talaat ed Dumm on the much congested motor road. All were back near Jerusalem on the 23rd. A Regiment of N.Z.M.R., some artillery, and a N.Z.M.C. detachment with the light horsed ambulance waggons remained in the valley. As the ambulance personnel had helped to nurse some cases of typhus abandoned by the Turks in Jericho, all went to the Mount of Olives where they were duly disinfested and got back gladly to Richon on the 26th.

But they were not to enjoy a long period of rest, as early in March preparations were afoot for a very remarkable raid by the Anzac Mounted Division. The intention was to interrupt the communications of the Turkish forces who, based on Amman, were operating along the Hedjaz railway against our allies, the Sherifean troops. Es Salt, the largest city east of Jordan, was to be seized by the 60th (London Territorial) Division operating along the motor road from Jericho; while the cavalry, outflanking the Turks, dashed into Amman and blew up a large railway viaduct in the vicinity. In order to do all this it was necessary first to cross the Jordan river, now in flood, and as the Turks in retiring from Jericho had burnt the wooden traffic bridge at the Ghoraniyeh crossing, where the motor road passes over to es Salt, it would be necessary to construct pontoons. Wet weather and a flooded Jordan delayed departure, but by the 20th of March, the force was concentrating at Talaat ed Dumm, halfway down to the Valley.

On the 13th a specially organised Mobile Section of the N.Z.M.F.A. under the command of Lieut.-Col. Walton, N.Z.M.C., marched out of Richon with the Brigade. They had left behind their Immobile Section, really "A" Section Tent Subdivision with part of the heavy equipment of "B" Section. The personnel of the Mobile Section comprised 5 officers, 35 O.R., N.Z.M.C., 1 farrier A.S.C., and 4 N.Z.E. signallers with a helio and lamps

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for intercommunication. The transport included 6 light horsed ambulance waggons, 4 sand carts, 24 cacolet camels, 37 baggage camels, 10 water carrying camels. The medical equipment, reduced to bare essentials, consisted of the most necessary panniers of the Tent Subdivision; extra dressings and splintage, medical comforts, 80 blankets, a Soyer's stove, and a few other stores. The tentage carried was one operating and five circular tents. All the personnel were mounted with the exception of the Tent Subdivision. Other ranks were supplied with Egyptian donkeys. Many difficulties were experienced on the march from Richon to Bethlehem over bogged roads in heavy rain; the camel convoy was for a time lost and part of the equipment, including splints and medical comforts, was looted by Bedouins; but the deficiencies were made up later, including four precious Thomas splints drawn from a C.C.S. in Jerusalem.

After a halt in the Judean Hills a descent was made into the valley and by the 21st March, all were concentrated about Talaat ed Dumm and Jericho. The force known as "Shea's Group" included the 60th Division, the Anzac Mounted Division, and one Imperial Camel Corps Brigade, a bridging train and three batteries of mountain guns. As the enemy, now warned by our enforced delays, held the crossings on the Jordan, the passage was a matter of some intricacy, but bold swimmers of the London Regiment established by night a small bridge head at Hajlah about three miles above the Dead Sea and the Anzac engineers threw over a pontoon which enabled the infantry to pass and to enlarge the bridgehead. Still nothing could be done at Ghoraniyeh until the Auckland Mounted Rifles, crossing by the pontoons, swept the eastern banks of Jordan by a series of charges. The following day the whole force was across, the 60th Division by a stout bridge at Ghoraniyeh, the cavalry at Hajlah. Crossing the Jordan plain, eight miles eastward to the Moab foothills, the N.Z.M.R. and the Mobile Section reached Shunet Nimrin on the es Salt road, where they halted for the night. The following day it was obvious that no wheeled transport could accompany the ambulance in its march up the mountains by villainous tracks through the valley of the Wadi es Sir so that the waggons were ordered back to the motor road and the Mobile Section with its camel transport breasted the long climb of 4000 feet to the Moab Plateau. All that day and all night they climbed over wretched muddy tracks in cold, bitter rain and sleet to the village of Ain es Sir, 15 miles from the valley on the western edge of the plateau. Many of the camels

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and some of the drivers perished during this fearful march, and so exhausted were men and beasts when they concentrated on the 26th, some two miles east of the Circassian village, Ain es Sir, that a 24 hour halt for rest was compulsory. This day es Salt was taken by the 60th Division and part of the garrison escaped to Amman by the main road.

Data of time and space must now be closely considered. Amman was about nine miles from the cross roads east of Ain es Sir; the road running north at the cross roads connected with the main es Salt–Amman Road—nominally a motor road—at Sweileh and passed through Bkt. um Audd, distant about two miles. At this point or some 400 yards to the west of it, it was decided to place a Tent Subdivision of the 2nd A.L.H.F.A. to act as a divisional receiving station. At Ain es Sir, the Tent Subdivision of the N.Z.M.F.A. would open, clearing to the motor road via Bkt. um Audd. It was considered that motor ambulance cars coming up from Jericho and passing through es Salt could reach the divisional receiving station at um Audd, which was about 15 miles east of es Salt, or 35 miles by road from Jericho. No other roads suitable for wheeled traffic existed. The nearest infantry ambulance M.D.S. was west of es Salt in the valley of the Shahib river. The Anzac Receiving Station—an operating team—would be established in conjunction with the Infantry M.D.S. Cacolet camels coming from the Anzac firing line would require four hours at least, to reach the motor road at Sweileh; the number of wounded transported—say 50 per trip of 12 hours. The nearest operating team was not less than 20 miles from the divisional collecting station. No wounded, clearly, could be carried down the rough tracks used by the cavalry in scaling the Moab mountains. All roads leading from Amman were mud tracks and unfit for wheeled traffic in this severe weather, as it had rained almost incessantly since the valley was left. The camels and their drivers upon whom we were dependent for all evacuations from the firing line by Bkt. um. Audd, were suffering greatly from exposure and short rations. Finally the nearest C.C.S. was in Jerusalem, 20 miles from Jericho—60 from Amman—but the road from there on was practicable—if not blocked with traffic—for heavy ambulance cars. These were some of the problems of the medical situation, without discussing the possibility of a shortage of medical supplies. The A.D.M.S. had at his disposal 3 tent subdivisions and 150 cacolet camels, enough transport possibly, for 150 wounded. Bad news came in early on the morning of the 27th when the cavalry were advancing

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over ploughed land with newly sown crops peeping through: it was found that the road east of es Salt was very narrow, very greasy, much broken up, blocked by abandoned Turkish lorries, and wrecked motor transport, almost impassable by motor ambulance cars and available with difficulty for wheeled transport only.

The N.Z.M.R. Brigade advanced on Amman and came into action three miles due south of the town with their right overlooking the Hedjaz railway, their left on the Wadi Amman. The bearers of the N.Z.M.F.A. formed a collecting post close to the river where they were for a time subject to shell fire but suffered no casualties. By 4.30 p.m. the N.Z.M.F.A. Tent Subdivision had opened with the Camel Brigade Field Ambulance about two miles out from Ain es Sir, on the road running east to Amman. The wounded, brought in by cacolet to the divisional collecting station at um Audd, proceeded thence by the divisional sand carts to the field ambulance of the 60th Division in the Wadi Shahib. By midnight on the first day 13 officers, 170 O.R. wounded, had been evacuated: of these, the N.Z.M.F.A. bearers had sent down 11 New Zealand wounded and 7 sick.

On the following day, the 28th, little progress was made: there was a very determined resistance by the garrison of Amman, well posted and well served by field artillery to which we could only reply with mountain guns. In the afternoon a general attack with the assistance of a brigade of infantry and the mountain guns did not realise any substantial gains, but time must be played out so as to allow the demolition parties, working to the south of Amman, to wreck the viaduct. The N.Z.M.F.A. bearer personnel, had a mounted runner both at brigade and divisional headquarters and were in constant touch with the R.A.P.'s. The bearers acted as escort for the wounded coming down in camel cacolets from the bearer post to the Tent Subdivision and served as guides for the returning camels. Evacuations from the front line were satisfactory but the Tent Subdivision was already running short of medical supplies, and blankets; the wounded were suffering severely from cold and sodden clothing, as brutal rain and icy winds still dogged the expedition. That day 13 officers and 124 O.R. wounded were evacuated from the Division.

On the 29th there was a shortage of wheeled transport at the divisional collecting post: sand carts sent from Bkt. um Audd through es Salt to the M.D.S. at 4.30 a.m. on the previous morning had not yet returned. The A.D.M.S. was urgently in need of tentage and supplies—there were only 6 operating and

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15 circular tents for the whole division. A cave and improvised shelters were utilised by the divisional collecting post which at one time held 243 patients. Eight camel loads of blankets, dressings and comforts were demanded by the A.D.M.S. but the Jordan was angry in flood and supplies could hardly be maintained. Fortunately, the Anzac Receiving Station had managed to push on beyond es Salt and with it came some light ambulance cars to a point two miles east of the town—the nearest to which motor vehicles could approach to Amman.

The attack dragged on, an affair of trenches and machine guns; but our people were determined—a night assault would be made and every effort expended to reach the viaduct. At 3 a.m. on the third day of the siege the New Zealand Brigade rushed a hill overlooking Amman; they advanced over 1000 yards and held the position against counter attacks, pushed well home with bombs and under heavy artillery screens; we had serious casualties. But all efforts elsewhere failed to shake the garrison in spite of their substantial losses; the game was drawn; we must withdraw. Early in the morning the bearer parties of the N.Z.M.F.A., in anticipation of heavy casualties, brought up all available cacolet camels and, until noon, all seemed to be going well, but with the very substantial losses incurred by the brigade during the counter attacks, the bearer post became crowded. No cacolet camels were returning. All were being used from the Tent Subdivision to the A.D.S. at um Audd; the camels breaking down from fatigue, want of food, and cold.

As the afternoon wore on the wounded of the N.Z.M.R. accumulated. The medical officer of the Wellington Regiment, Captain Gow, N.Z.M.C., the R.M.O. of the Auckland Regiment, Captain Wilton, N.Z.M.C., and an R.M.O. of the Camel Battalion had a combined R.A.P. about 1000 yards in rear of the hill taken by our Brigade which became congested with wounded. In spite of urgent calls from the ambulance and the brigade headquarters, no camels could be obtained. The R.A.P. had to be cleared by carrying the wounded back over a mile to brigade headquarters in blankets, the combatants doing most of the work, and the post was cleared at 4 p.m. when the orders to withdraw were issued. After this only 2 cacolet camels came up to the R.A.P. although some 20 to 30 wounded were brought down from the firing line. All these patients the R.M.O.'s tied to their horses—some had penetrating wounds of head, thorax or abdomen—and the firing line held fast for a precarious three hours until all were brought away. The only alternative was to

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abandon the wounded to the Bedouins. At 9.30 p.m. four pairs of lying and five pairs of sitting cacolets left the bearer post; then no camels until 11 p.m. and these utterly exhausted. Had it not been for a few baggage camels obtained from the I.C.C. more wounded would have had to face a nine mile journey to the divisional collecting station on a wild night, lashed face down head to tail on their horses; even with broken limbs. By this time all the forward area was clear. At 8 p.m. the N.Z.M.F.A. Tent Subdivision had 100 patients and still more coming in; it was not until 2.30 a.m. on the 31st that the dressing station was hurriedly cleared by cacolet camels of the I.C.C. while the cossack posts of the rear guard held off the Turks. Next morning the Brigade was about Ain es Sir, our Tent Subdivision with its camels and equipment going on down by the mountain track, through which they had ascended, to Shunet Nimrin, at the foot of the mountains. The bearer personnel with cacolet camels remained with the Brigade and bivouacked for the night near Ain es Sir.

At 7 a.m. on the 1st April, the march was resumed down the Wadi Sir. The rear guard, formed by the Wellington Regiment, no sooner clear of the village of Ain es Sir, was fired upon by the Circassians, losing 8 killed and 8 wounded, including one N.Z.M.C. bearer who had a penetrating wound of the abdomen. While the Wellingtons dealt bloodily with the offenders the ambulance people loaded the wounded on the cacolets, bringing all safely to Shunet Nimrin by 7.30 p.m. The total of casualties tended by the divisional collecting station—which travelled by the main road —was 513 wounded, 49 sick, British troops; and 13 wounded and 10 sick Turks. The casualties in the N.Z.M.R. Brigade were:— killed: 6 officers, 32 O.R.; wounded: 6 officers, 116 O.R.; missing: 13 O.R. Yet in spite of the hardships of evacuation over nine miles by cacolet or, in some instances, lashed to a horse, and at least fifteen miles over a very bad road in sand carts, or again by cacolet, and a motor journey of 40 miles to Jerusalem, the condition in which the wounded reached the C.C.S.'s was considered to be on the whole most gratifying. Five wounded are reported to have died in transit on the Moab plateau which, considering the means of transport, shortatge of blankets, and the severe weather, is not remarkable. Most astonishing is the completed story of the medical arrangements and the surprisingly good condition of the wounded; much to be admired the determination with which the R.M.O.'s* so well assisted by the fighters, carried off all their wounded under the very eyes of the

* Capt. Gow received the M.C. for this engagement.

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enemy, as, had they used their eyes, they must have seen when the moon was up at 8.30 on the night of the withdrawal. Beyond all praise the dogged heroism of the camel drivers who, shivering in their cotton clothing, hungry and forlorn, stuck to their miserable camels and brought the wounded safely through.

And now for the rest of the summer and early autumn the Anzac Mounted Division was in bivouac in the weird depths of the Jordan Valley, 266 fathoms below sea level, where no Europeans had ever dared to live in summer time before. But the Anzacs were not Europeans and they stuck it out somehow, although in the summer months the thermometer rose above 115° F. in the coolest double tents of the ambulance, and an acrid alkaline dust hung in the scorched atmosphere penetrating everywhere, scalding the throat and searing the eyes, and the Khamsin blew such fiery gusts that even the flies died.

Sanitation presented many difficulties. Horse manure and human dejecta spread in the sun dried to tinder in two days and burnt readily, but the dust nuisance required sedulous regulation. Mosquito brigades worked incessantly, canalising the stagnant pools, clearing out weedy growths and oiling the waters that trepidated with the larvæ of anopheles. There was at first a serious wastage from malignant malaria: during June and August the cases averaged 80 a week in the Anzac divisional troops employed in the valley; as many as 221 were evacuated in the first week of August. But after this, while in the protected areas, the rate fell by one half and it was not until September that malignant malaria decimated the troops. In all this work the Anzac Mobile Laboratory, which remained in the valley throughout, rendered most valuable assistance, more especially in training the ambulance officers in malarial diagnosis.

Casualties were light although there were frequent affrays of outposts east of Jordan. Short periods of rest up in Judea at King Solomon's pools, Bethlehem, and Jerusalem, where the air was keen and wondrous chill after the heat of the valley, helped to maintain the Anzacs in some degree of fitness; but high sickness wastage rates were recorded. In July the average was nearly 40 per 1000 per week evacuated to C.C.S. and this figure was exceeded in September. Malaria, of which the malignant form increased in incidence in late autumn, was the chief cause of wastage. Gastro-enteritis and dysentery were a negligible factor. Many mild cases of sickness were treated in Jerusalem at the Desert Corps Rest Station, and the usefulness of this institution in maintaining strength was abundantly manifested.

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But now the end was at hand; once more the Anzacs would climb the mountains of Moab and this time to a final victory over Amman and the IVth. Turkish Army. Allenby's master stroke was to break the Turkish line in the plains of Philistia, unleash his impatient horsemen and sweep all Armageddon into a net cast towards Damascus. All happened as planned; on the 19th of September the enemy lines of resistance broke and melted in the orange groves of Jaffa; three divisions of cavalry galloped through the breach, never halting until they drew rein about a beaten army. No more complete victory is known to history.

In preparation for the last campaign General Chaytor took command of all the British troops in the Jordan Valley; his command known as "Chaytor's Force," comprised the Anzac Mounted Division, the 20th Indian Infantry Brigade, 2 battalions of Jewish troops under Patterson of Zion Mule Corps fame, and 2 battalions the West Indian Regiment. The task assigned to this composite force was to secure the right flank and the Jordan crossings, and to exploit any withdrawal that offered opportunities for a winning stroke against the IVth Turkish Army. The 19th, the day of the great battle on the coast, certain first moves took place in the Jordan Valley. The 1st N.W.I. Battalion was operating north of Jericho on the west of Jordan. Captain Hay, N.Z.M.C., in charge of 15 camels and 12 bearers, detached from the Mobile Section went up to collect wounded and admitted 23 West Indians. The N.Z.M.F.A. Mobile Section was still in camp, but at 9.30 p.m. on the 21st moved to the Wadi el Auja to take over a station of the 1st A.L.H. Field Ambulance, three miles north of Jericho on the Roman road west of Jordan, where Captain Hay's party rejoined. That night the N.Z.M.R. Brigade moved on and occupied Fussail, ten miles north of Auja; some 39 casualties—only three New Zealanders—were evacuated by light horsed ambulance waggons and light motor ambulance cars. The following day, the 22nd, the British line was 20 miles north of Jerusalem and the New Zealanders were securing the important bridge across the Jordan at Jisr ed Damieh, capturing many prisoners while their casualties were light. By evening their advanced guard was across the Jordan following the Turkish rearguards to es Salt. The ambulance opened a dressing station in the foothills near the crossing at 5 a.m. The wounded brought in by camel cacolet were mostly Turkish; our casualties were trivial. In the afternoon the ambulance moved down to the flat near the bridge where they took over a Turkish field hospital with 128 sick and 4 wounded, captured by our Brigade, whose

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bag included a divisional commander and over 500 prisoners. All patients were evacuated that night along a very rough road to K. Fussail, where the 1/1 Welsh Field Ambulance took over. A convoy of light motor ambulance cars carried on the line of evacuations to Jericho.

It was now clear that the IVth Turkish army which had faced us all the summer was retiring in all haste to Moab and the Hedjaz railway. What followed is soon told. Again the long and exhausting escalade of the mountains of Moab; a day's halt for concentration about es Salt and Ain es Sir and a brilliant envelopment and capture of Amman almost without artillery support—the guns were slow to clear the mountain tracks—and, on the 25th, the surrender of the garrison, some 1700 in all, with about 500 sick. The day after the fall of Amman the New Zealand ambulance took over a Turkish hospital near the railway station and after the capitulation of the Turkish corps to the south of Amman, tended over 500 enemy sick near Kissir.

So ended the war against man and here began the victory of disease. In the first 12 days of October the ambulance admitted over 700 cases of malaria, most of it malignant. The New Zealand Brigade lost at least a third of its strength. Many a horseman dropped from the saddle during the descent to the Jordan, and many died afterwards in the hospitals in Jerusalem. All through September the incidence of malignant malaria had been increasing in the debilitated troops holding the river crossings, where anti-mosquito measures were not neglected; but the effect of moving into the untreated Turkish areas at the Damieh crossing north of Jericho was a wholesale infection of the New Zealand Brigade with P.U.O. of which 62 per cent. was diagnosed as malaria, and in the greater number the disease was malignant in type. Furthermore, there were over 1000 cases of P.U.O. negative for malaria which were influenza, no doubt contracted from the Turkish prisoners. The D.A.D.M.S., Major Hercus, D.S.O., N.Z.M.C., who had devoted much energy to anti-malarial work in the Jordan Valley, estimated that during the period of the final operations the Anzac Division alone had 2827 cases, and the whole of Chaytor's force suffered a loss of 4543 by malaria. The last battle was fought and won during the incubation period of malaria; and it was fortunate for the force that this period was not shorter. Here is a poignant episode for the preventive commentator, another "Walchern" wherewith to bludgeon the sanitary conscience of the Army.

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Back to Richon and the battlefield of Ayun Kara, where, at the foot of a monument erected by our friends the Zion Colonists, the Armistice was celebrated by a memorial service. And then a long rest at Rafa, and later police work in the Nile Delta, until the New Zealand Mounted Field Ambulance was demobilised in June, 1919, and sailed for New Zealand after five and a half years memorable service in the East.

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Chapter XXI.

Demobilisation.

The outlines of a scheme for demobilising the N.Z.E.F. were drafted at an early date by the G.O.C. in charge Administration, Brigadier General Richardson, C.M.G., C.B.E. In 1917, he had foreseen the necessity for making special provision for the repatriation of disabled men, more especially the blind and limbless; and out of the projects devised to this end, the vocational classes for the limbless in Oatlands Park had grown to importance in 1918. Prior to the Armistice, in conformity with the scheme of demobilisation, the accumulation of low category details was gradually reduced by repatriation so obviating congestion in the Hospitals, more especially in anticipation of heavy casualties in 1918. The Division in France was also facilitating the return to New Zealand on furlough duty, of men with long service: in the case of the N.Z.M.C. both officers and men who had served continuously since 1914 were in some instances permitted to return to their homes for urgent business or family reasons; so that the process of Repatriation had been going on to a limited extent during the spring and summer of 1918, although temporarily interrupted during the mid period of the German offensive.

At the end of October, 1918, the figures upon which the scheme of demobilisation was based were sufficiently imposing: no less than 100,658 men had been embarked for the N.Z.E.F. in New Zealand ports, of which 26,109 had been repatriated and 15,910 had been killed in action or had died of disease overseas. The strength of the N.Z.E.F. in the various theatres of war or on the seas, was at this time 58,560 of which over 50,000 in France or the United Kingdom, and 3,500 in Egypt or Palestine. Repatriation in bulk was initiated immediately after the Armistice; the number of transports available, including most of the large ships then trading to New Zealand, was considered adequate to the purpose of embarking at least 1000 men per week and the time required to complete the evacuation of the war zones was estimated at twelve months. The problems specially interesting the Medical Services were:—

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(1) The embarkation of the wounded and sick; (2) The demobilisation of N.Z.M.C. personnel; (3) The provisions for reconstruction in New Zealand.

The Medical Headquarters of the N.Z.E.F. in London was in 1918 organised in various branches somewhat resembling those of the British Army Medical Service. At the head was the D.M.S., Colonel Parkes, C.M.G., whose duties comprised: general policy; liason with the War Office; inspections; promotions and appointments of N.Z.M.C. officers; honours and awards. The office of the Matron in Chief, Miss Thurston, R.R.C., included in this branch, administered the N.Z.A.N.S. in England, France and Egypt, and controlled the female staffs attached to medical units.. The A.D.M.S. Department, under Lieut.-Col. B. Myers, C.M.G., had charge of hospital administration; transfers and discharges; embarkation of sick and wounded; medical boards, and classification. Under this Department were: the consulting physician and the consulting surgeon; the president of the United Kingdom Medical Board; the officer in charge of medical boards and classification in London; the officer in charge of medical returns and statistics; the historical, medical research and war museum sections. The D.A.D.M.S., Major McKibbin, and his department, were responsible for: personnel N.Z.M.C., exclusive of officers; posting, transfer and promotion; training; reinforcements; sanitation. Included in this department was the Quartermaster's Branch, which was responsible for the purchase of and accounting for all medical stores and equipment supplied to medical units, including transports. The strength of Medical Headquarters was: 7 officers, 74 O.R. during demobilisation, but was normally: 6 medical officers, 1 commissioned quartermaster, N.Z.M.C., 1 lay officer, N.Z.M.C. and 25 O.R.

The D.M.S., in the early part of 1918, had amplified and strengthened our hospitals so as to make provision for the casualties anticipated during the German Offensive. In order to relieve congestion in the medical units the principle had been adopted of supplementing the hospital ship service by ambulance carriers, improvised of the larger and better found transports.

The expansion of the hospitals by tents or the construction of buildings had increased the bed strength to a total of 6,495: the two large General Hospitals having over 1500 beds each, while the Convalescent Hospital at Hornchurch had a 1000 more. The number of patients of the N.Z.E.F. actually hospitalised in March, 1918, was:—in British hospitals, 26 officers and 1058 O.R.; in

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New Zealand hospitals: 140 officers, 4,506 O.R.—in all 5,730 sick and wounded of all ranks, while the low category men or permanently unfit numbered nearly as many.

The necessity for providing specially trained N.Z.M.C. personnel for the service of reconstruction in New Zealand had been appreciated in 1917, and in accord with this policy Lieut.-Col. Wylie, C.M.G., N.Z.M.C. commanding No. 1 N.Z.G.H., was seconded, in February, 1918, and attached for training to Shepherd's Bush Military Orthopœdic Hospital and Lieut.-Col. Mills, late commanding No. 2 N.Z.G.H., was similarly detached to the Liverpool Orthopœdic Centre at Alder Hay. The intention was to form two military orthopœdic teams to be despatched at an early date to New Zealand, each team consisting of 4 surgeons, 1 surgeon in charge of physio-therapy, 1 radiologist, 4 trained masseuses, 2 N.C.O.'s gymnastic specialists, 1 expert plaster worker, 1 N.C.O. in charge records. The course of training in military orthopœdics was laid down as three months minimal, and was supervised by the army specialists, under Sir Robert Jones. The first of the orthopædic teams sailed in the summer of 1918, under Lieut.-Col. Wylie, and proceeded at once to organise special units in New Zealand, more especially Chalmer's Military Hospital at Christchurch, and Trentham Military Orthopœdic Hospital.

In the outlined scheme of demobilisation an educational campaign was the most prominent administrative provision for tiding over the dangerous period of non-military employment and relaxed discipline following the Armistice. Within the scope of the educational scheme the special training of experts in the N.Z.M.C. was included, as the opportunity available for promoting the efficiency of the medical services in New Zealand was rightly deemed to be of national importance. To this end a small number of officers and men of the N.Z.M.C. serving in France had been returned to England for duty, so that they might renew their knowledge of clinical work in the Hospitals. And further, it was agreed that all those whose long service in the field units—where clinical opportunities were few—had militated against advance in their professional knowledge should be granted some months of study leave in England prior to repatriation. Similar courses for N.C.O.'s who desired to take up laboratory work, massage, radiology, pharmacy, or allied specialities, were already in contemplation.

In the larger hospitals—Brockenhurst, Walton and Hornchurch—beyond changes in personnel and increase of bed states, there

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were no important alterations during 1918, but in each the organisation had been strengthened and the quality of the work had materially improved, keeping pace with the general progress in knowledge of military diseases and the injuries of war. At No. 1 N.Z.G.H., Lieut.-Col. P.C. Fenwick, C.M.G., replaced Lieut.-Col. Wylie in February. The monthly admission rate for this unit varied from 587 in February to 1308 in September. It had been found in the previous year that the accommodation was inadequate to cope with the large numbers of casualties coming over from France. At Brockenhurst the increased bed state was provided for by the erection of Tent Sections: marquees to accommodate 16 beds each were erected in two sections, one being at Balmer Lawn, but the larger number in the central section. The bed state was thus increased to 1600 and the hospital actually accommodated 1661 patients during September, the maximum bed state being attained on the 26th following the Battle of Bapaume. During this period there were 1820 admissions and 1282 discharges. The Massage and Electrical Department was considerably increased in staff and equipment, and a new building provided, in which over 5000 patients were treated during the year. Splint making was so developed as to provide all required apparatus, and many locally devised appliances were constructed in the shops of the hospital by skilled workers of the N.Z.M.C. trained at Shepherd's Bush. As part of the vocational training of the disabled, agricultural operations such as pig rearing, bee-keeping, poultry farming, and the culture of vegetables including potatoes, were successfully attempted and became profitable ventures. Curative workshops opened in 1917 were well attended and the classes in carpentry, metal work, sign writing, and lighter occupations, proved to have reparative value in relieving war disabilities. Recreation was well provided for by the Y.M.C.A. in their own hall and by the kindly and ever generous residents of the Brockenhurst district. The chief administrative difficulty was the very scattered disposition of the various sections. Certain auxiliary hospitals had been taken over from the Red Cross Society or private individuals during the period of occupancy, namely: an Officers' Convalescent Hospital at Avon Tyrell, the residence of Lord Manners, under the care of the Hon. Miss Manners, R.R.C., with accommodation for 24 officers; Morant War Hospital in Brockenhurst village, managed by a committee of residents, with beds for 70 to 80 patients, increased by tents to 120. Thornby Hill, the residence of the Misses Hay provided 24 beds for New Zealand patients. At

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Lymmington, Home Mead, a large private house with an annexe about half a mile distant, provided 70 beds and was controlled by Mrs. Chenery. Another grave difficulty was the inadequate accommodation for N.Z.A.N.S. and female staff accentuated by the despatch of male orderlies to France and the substitution of V.A.D.'s. The female staff grew to 247 inclusive, of which 86 were N.Z.A.N.S., and the housing of so large a female staff had to be provided for by renting various houses in the village until late in 1918 more convenient quarters were provided in buildings erected for the purpose in the hospital precincts. Balmer Lawn Neurological Section with its annexes under Lieut.-Col. Marshall McDonald, N.Z.M.C., Neurologist and Consulting Physician to the N.Z.E.F., had grown to be an important unit, and provision for a similar institution in New Zealand was under consideration. The Surgical Division under Major T. D. Stout, D.S.O., was now fully equipped with all modern requirements and organised in separate wards each reserved for special types of gun shot injury, with specially trained nurses in each. At the end of 1917, Capt. D. E. Fenwick, N.Z.M.C., late of the R.A.M.C., had replaced Major Bowerbank as Registrar and Officer in Charge of the Medical Division.

As we have seen, Lieut.-Col. O'Neil, D.S.O., relieved Lieut.-Col. Mill in January, 1918, at No. 2 New Zealand General Hospital. Extra accommodation for limbless was provided at Oatlands Park about this time by the construction of huts, and the general bed state raised to 1800. The accommodation was fully taxed during April and September in sympathy with the operations of the Division, when the daily bed state averaged 1662. Major G. Home, N.Z.M.C., had charge of the Surgical Division, with occasional assistance from Lieut.-Col. Acland, N.Z.M.C., the Consulting Surgeon, whose headquarters were at this Hospital. Major A. Hoskin, N.Z.M.C., was in charge of the Medical Division in the latter half of the year. The substitution of female workers for male N.Z.M.C. personnel was stated to have met with considerable success at Walton and in view of this the feasibility of such substitution in other units was well favoured. At Oatlands Park the classes of instruction for limbless patients had prospered and at an exhibition of work shown in London in May, 1918, before the Allied Conference on "After Care of Disabled Soldiers," the exhibit furnished from Oatlands Park, the work of our limbless soldiers, was reported to be the best and most practical display in the whole exhibition. The course of training, to which many maimed men now owe their success in life,

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started in bed, was continued in the classes during convalescence in hospital and ultimately completed by attachment for from three to six months to a workshop, factory, or similar civil unit in England prior to the soldier's passing into the control of the Repatriation Department in New Zealand, where a system of subsidised apprenticeship ensured the launching of the pupil under the best conditions in his new occupation.

The Department of Plastic Surgery of the Face, under Major Pickerill, N.Z.M.C., was in 1918, transferred from Walton to Queen's Hospital at Sidcup, twelve miles from London. Extra officers were attached to the New Zealand Section there: Captain Marshall, N.Z.M.C.—severely wounded just before Messines—as Specialist Anaesthetist; Captain Rhind, M.C., N.Z.M.C., as Assistant; and Major Rishworth, N.Z.D.C., as Surgeon Dentist. The New Zealand Section participated in the fine work of the well known "Jaw" Hospital and was ultimately transferred intact to the Dunedin Hospital with 59 patients in 1919, so bringing back the expert knowledge of plastic surgery which had attained to such perfection during the war, and which was essential for the adequate treatment of some of the returned men.

At the New Zealand Convalescent Hospital at Hornchurch, with a capacity of 2,500 beds, the most important change in 1918 was the opening of a School of Massage. All through 1918 there had been an acute shortage of N.Z.A.N.S. personnel—supplemented in rush times by the good offices of the Canadian Army Nursing Service—but more especially a shortage of trained masseuses. To meet this the D.M.S. instituted a course of training at Hornchurch in conformity with I.S.T.M. standards. A six months training was considered sufficient, but in order to comply with the New Zealand requirements a further course of three months in Swedish remedial exercises and three months in electrical treatment was required. Many of the candidates trained at Hornchurch were enabled to attain the I.S.T.M. certificate, and in this way our future requirements were provided for.

No. 3 N.Z.G.H., under Lieut.-Col. McLean, N.Z.M.C., late O.C. No. 4 New Zealand Field Ambulance had expanded to nearly 1000 beds, including the venereal section of 500 beds. Five new wards had been completed by February, 1918; shelters for the accommodation of T.B. cases had been erected on the hillside above the Hospital. The site, in a deep cleft of the downs, was very damp and drowned in mists during the winter, hot and breathless during the summer by reason of the enclosed nature of the ground and the tier like structure of the wards on the

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hillside, all of which made the Hospital both uncomfortable and inconvenient. In the Venereal Diseases Section of Codford Hospital a notable decrease in the admission rate had been gratefully recorded: in September 1918, the number of patients under treatment was 240, whereas in the corresponding month of 1917, it had been 410. The V.D. admission rate had yielded a constantly falling curve for nearly 12 months past, the credit for which was claimed by the partisans of the various creeds of preventive belief. Some held that it was due to the free issue of prophylactic packets, contraceptives, and vigorous propaganda; others claimed a triumph for the E.T. or "Blue Light" establishments. The deterrent effect of Sec. 40a of D.O.R.A., under which a woman was sentenced to six months imprisonment for infecting a New Zealand soldier in September, 1918, was thought by some to be an effectual check on dissemination, but the difficulty of obtaining evidence rendered the enactment almost nugatory. The patrolling of the streets of London by ladies attached to the New Zealand Y.M.C.A. was an heroic effort much to be admired and possibly did some good. But above all the successes claimed for the abortive treatment of gonorrhoea as practised by army surgeons of the Dominion forces, the confidential nature of the work, and the implicit belief of the men in the efficacy of the treatment, unquestionably led to earlier declaration of infection and a more ready attendance at the ablution rooms. It appears to the writer that propaganda and the improved methods of post-coital disinfection in the ablution rooms had a marked bearing on the fall in incidence in the United Kingdom troops. The greater part of the men infected contracted the disease after discharge from the Convalescent Hospital. Large sums of money were often available to these men on sick furlough during which excesses were almost inevitable as a reaction from the stress of active service, wounds and prolonged residence in Hospital. It was in the admission rate from the Command Depot, to which all convalescents reported after their leave had expired, that the most remarkable reduction was noted, soon after the establishment of a special E.T. establishment under a skilled staff, including a whole time M.O. The work of the staff included the inspection of all new arrivals within an hour after reporting at the depot by day or by night. Microscopic diagnosis was utilised to the fullest extent, and a toilet, carried out by a trained N.Z.M.C. orderly, was provided which was in accord with the best practice of the period and included careful irrigation, the use of mild silver solutions and

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calomel inunction. Combined with this institution was the abortive treatment department which followed the methods recommended by the Australian Genito-urinary specialists at Horseferry Road in London. Whatever the results, and in spite of the occasional complications, the method had this to recommend it that it attracted the men by its confidential nature, freedom from notification and loss of hospital stoppages. It brought the men and the surgeon together in the co-operative fight against disease, and by its moral effect proved to be the most efficient propaganda.

The chief medical considerations in the camps and depots during the year had been the virulent epidemics of septic pneumonia and purulent bronchitis. In the first term of the year the 31st and 32nd Reinforcements had suffered from an epidemic of measles, rubella or morbilli—contemporary reports say both—which was complicated by fatal broncho-pneumonias. 75 cases of pulmonary infection resulted in 35 deaths, mostly at Brimsdown Bottom Isolation Hospital, Tidworth, during February, March and April. The disease arose on board ship and is reminiscent of the similar outbreak amongst our soldiers returning to New Zealand by the "Britannic" in July, 1902, at the end of the South African War, referred to in chapter I. It was stated that the more serious form of the disease—whatever it was—was contracted at Newport-News, Virginia, where the ship had called to coal. Some of our men had visited a U.S. camp where the diseases had been prevalent and where purulent bronchitis as a complication had been very severe. The ventilation of the transports, especially at night, was defective, owing to the necessity for keeping the ports closed in the submarine zone, and for this reason the epidemic assumed graver proportions. In view of the seriousness of the outbreak and the necessity for determining the specific cause of the complications, Lieut.-Col. Marshall Macdonald, N.Z.M.C., the Consulting Physician, and Major Ritchie, N.Z.M.C., Bacteriologist at No. 3 N.Z.G.H., were detailed to assist the small R.A.M.C. staff at Brimsdown Bottom Hospital. Pathological investigations of fatal cases revealed conditions of acute bronchitis with copious purulent secretion, areas of consolidation and broncho-pneumonia, and emphysœma, with signs of generalised infection. The Bacteriologist noted the presence of *Streptococcus longus*, associated with *B. influenzae*, *pneumococci* and *staphylococci*. A *streptococcus* was occasionally isolated from blood-cultures. The invariable presence of *B. influenzae* as determined by culture of the sputa by Dr. Eyre of St.

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Thomas's Hospital was a remarkable finding, as it put this type of pulmonary infection in the same category as the influenzal pneumonias seen later on during the year. The similarity of the necroscopic and laboratory findings with those reported in New Zealand during the winter epidemics is also worthy of note. Similar cases had been observed in France in the winters of 1914, and 1916; few if any in 1915. Purulent bronchitis was a frequent complication of wounds more especially of the chest, and usually the bacillus of Pfeiffer was the organism most constantly found, although there were no epidemics of influenza at the time.* The presence of a *streptococcus* as in Trentham in 1916, was a characteristic of the Sling epidemic of early 1918, but as another investigator, Capt. Lowe, N.Z.M.C., Bacteriologist of No. 2 N.Z.G.H., had by blood agglutinations shown a definite lack of immunity to the *pneumococcus* in New Zealanders, all were agreed to adopt an immunising vaccine prepared by Dr. Eyre in collaboration with Captain Lowe and containing mixed organisms†. The vaccine was known as M.C.V. (Mixed Catarrhal Vaccine) and had at first the following content:—

Pneumococcus	50 to 100 Million	per ½ c.c.
Streptococcus	10 to 50 Million	per ½ c.c
B. Influenzae	10 to 30 Million	per ½ c.c.
Staphylococcus aureus.....	200 to 500 Million	per ½ c.c.
Micrococcus Catarrhalis	25 to 75 Million	per ½ c.c.
B. Pneumonia	50 to 100 Million	per ½ c.c.
B. Septus	50 to 100 Million	per ½ c.c.

The vaccine was designed to produce an artificial immunity not only against the first three virulent organisms most frequently found in fatal purulent bronchitis, but also to immunise against the other organisms found in catarrhal sputa and nasal discharges. The vaccine was made compulsory for all reinforcements; it gave rise to little obvious reaction administered in two doses at a week's interval, and yielded some evidence of immunising power during the influenza epidemics in England.

The lengthy report on the Sling epidemic furnished by the Army Sanitary Committee on February 28th, 1918, after pointing out the known fact that measles in armies was noted for the increasing severity of the cases during the progress of the epidemic and that the case mortality in such epidemics in the American Civil War had, at times, reached 20 per cent, while in

*Official History of the War, Diseases of the War, Vol. I., page 213.

†Eyre and Lowe Prophylactic Vaccinations against Catarrhal infections. Lancet, 1918, Vol. II., page 484.

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the siege of Paris as many as 40 per cent. of the sick had died, insisted that the hypothesis of a specially virulent type of measles was unnecessary to explain the high case mortality in this outbreak. Its seriousness was explained by the simultaneous presence of other catarrhal infections, a condition aggravated in the crowded and ill-ventilated ships and leading to massive mixed infections. Measles, cerebro-spinal fever, influenza, and acute tonsilitis had affected the troops on board the *Willochra* after sailing from New Zealand, but the full virulence of the enhanced infection did not mature until shortly before landing. Here we have an epitome of the plagues of Trentham and building stones in the world wide epidemics about to come.

Another and a more serious outbreak was that which occurred on board the troopship *Tahiti*, in August, 1918. The transport carrying the 40th Reinforcements, including 21 officers, 10 N.Z.A.N.S. and 1080 men called at Sierra Leone towards the end of August, where she had rendezvous to form part of a convoy. Contact was made with H.M.S. *Mantua*, a cruiser infected by a serious and fatal form of influenza. Within a few days of the sailing of the convoy, influenza broke out in the *Tahiti*, and practically the whole ship's complement was affected. A very fatal broncho-pneumonia which complicated the more serious cases, caused 68 deaths at sea before landing at Plymouth, and of the surviving sick, 116 in number, who were transferred to No. 3 N.Z.G.H., three died of purulent bronchitis, and one sister, N.Z.A.N.S. of cerebro-spinal meningitis. It is hardly possible to realise the difficulties of dealing with such a pandemic on board a crowded transport in a submarine zone, where ventilation was limited by reason of the closing of portholes at night, and where practically everyone suffered from the disease, including the three medical officers, the nursing sisters and the N.Z.M.C. orderlies. Much could be said of the zeal and fortitude of the O.C. troops, Lieut.-Col. R. Allen, D.S.O., and the devotion of the N.Z.A.N.S. and the medical officers who were unremitting in their attentions to the sick. The deaths which occurred daily and in daily increasing numbers until no less than 20 bodies were committed to the sea on the 4th of October, had a depressing effect on all, and led to a despondency and apathy in the sick, which in many cases seemed to determine a fatal issue. The cause of the outbreak was closely investigated in Codford, Captain Lowe, N.Z.M.C., coming down from Walton and working in collaboration with Captain Eagleton, R.A.M.C., pathologist at Sutton Veney, who had previous experience of the Sling epidemic.

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The opinion of these officers was that the condition was one of severe influenza complicated by purulent bronchitis. The *Bacillus of Pfeiffer* was demonstrated in 90 per cent. of the fatal cases in combination with *Streptococcus longus;* the changes found post-mortem agreed with the usual findings in purulent bronchitis.

Interest in the epidemic, however, was soon diverted by the most serious of all outbreaks, the influenza epidemic of October and November in France and England. Several thousands of cases in the N.Z.E.F. were reported during this epidemic which affected the Division in France and the camps in England; the total loss from pulmonary complications probably exceeded 150 and in most instances the fatality rate in the pneumonic type was extraordinarily high. The New Zealand Stationary Hospital reported a complication incidence of 12 per cent in all cases of influenza admitted during October and November, and a mortality of over 50 per cent for the pneumonias. The large camps at Sling and Brocton suffered most in England. At Brocton there were 960 cases with 71 pneumonias and 47 deaths up to the 21st of November, 1918. On the 5th of October, the disease was made notifiable in the British armies in France, which had an incidence of 112,274 cases with 5,483 deaths during the winter crisis. Those who had seen the early cases of purulent bronchitis at Sling and Brimsdown Bottom and had marked the heliotrope cyanosis and helpless apathy of the fatal cases of the *Tahiti* needed no warning as to the outcome of the wholly similar cases seen in France and England at the end of 1918, and already foreshadowed in the reports of the cases observed at Trentham Camp in 1915 and 1916. Nor has the identical cause of this pandemic as yet been made clear: whether it was a virus of the camps bred in men whose vitality was lowered by stresses of war and so enhanced in virulence by passage as to reach in time to the status of a world plague, or whether it was a demonstration of team work by the already known organisms is as yet not fully determined. Whatever the causal agent, perhaps the results led in some way to a furtherance of peace by warning the human race to desist from war, whose hardships had weakened all alike against the common foe, disease.

When the armistice came the medical arrangements for demobilisation were well matured. On November the 30th the hospital bed states showed that there were in British hospitals: 63 officers, 1379 O.R. sick and wounded of the N.Z.E.F., and in the New Zealand hospitals, 172 officers, 4714 O.R., while there was a population of about 3000 category men in the Command Depot.

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During the year the hospital ships had continued to sail at one month's interval so that from two to three months elapsed without evacuations, but special transports for lighter cases had helped to fill the gaps. In July, owing to the torpedoing of the *Llandovery Castle*, hospital ships were obliged to travel via Suez and the Mediterranean. The *Marama*, in August, with a Spanish Commission on board called at Marseilles and, by decision of the War Office, was not permitted to pass beyond. Cot cases had to proceed overland from England, a condition which prohibited the despatch of the most serious cases so that the curious anomaly resulted that patients too ill to embark on the hospital ships went home in ambulance carriers. In November, both hospital ships were en route for England and were due in December; both, it was anticipated, could clear all the serious cot cases. A delay in the despatch of the *Marama* from New Zealand had caused serious inconvenience in England by congestion of cot cases, but now, the disappearance of submarines had removed all difficulties in transport. The fine transports *Ruahine* and *Maunganui* had been adapted as ambulance carriers, and the great majority of the low categories could be safely accommodated in the ordinary transports. In December, all four ships were loading, thus relieving the hospitals and making way for demobilisation of personnel and equipment. An Embarkation Medical Board under Lieut.-Col. Tracey-Inglis, N.Z.M.C., was set up in January, 1919: the duties of the board were to make provision for the supply of adequate medical personnel and equipment for the transports. The staff of each transport carrying 1000 troops comprised: 2 medical officers, 5 N.Z.A.N.S., 4 Red Cross workers (females) and 10 N.Z.M.C., O.R. Special arrangements were made for the attachment of additional female workers where soldiers' families were included in the draft and supplies of artificial milk devised by Dr. Truby King were carried for the use of the babies. The medical stores were furnished by the hospitals for the first ships, but in view of the large stocks of drugs and medical supplies held in New Zealand and the enormous advance in prices in England, it was considered advisable that returning transports should replenish stocks in the Dominion. The medical arrangements, then, for the evacuation of sick and wounded included: (1) hospital ships for cot cases and the more serious walking cases; (2) ambulance transports for walking cases still requiring a continuance of special treatment such as, say, physiotherapy and, (3) ordinary transports for disabled men or convalescents not requiring any treatment. The classification of

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these categories was carried out in the hospitals for (1) and (2), for (3) at the Command Depot.

It was of the utmost importance that the increase of medical work during the early stages of demobilisation should not interfere with the existing scheme of medical boards and classification, as the importance of adequate boarding in England was thoroughly appreciated as a preliminary to the work of the Pensions' Boards in New Zealand. The collection and preparation of case sheets, reports, and provisional board papers was a matter to which a considerable amount of detailed attention was directed. All the "A" men were drafted to Sling Camp where they underwent a physical inspection prior to embarkation, while the category men were concentrated at Codford at the Command Depot; and those already found to be permanently unfit (C2) were assembled in the Discharge Depot at Torquay. As the New Zealand standing medical board in France was now no longer required, the President, Major Bowerbank, N.Z.M.C., with his staff, was recalled and established at Codford for the purpose of finally boarding the "B" group to be concentrated there. All case sheets and documents were forwarded to the depot—the medical history sheets had previously been filed at the office of the A.D.M.S. in London—and a board of from 10 to 14 medical officers was set up in specially devised quarters with a large N.Z.M.C. staff, the whole so organised and administered that at least 400 men could be adequately boarded in one day. The assistance of the specialists at No. 3 N.Z.G.H. was made available in doubtful cases and the service of the V.D. section furnished criteria for estimating the present condition of those who had records of venereal infection. The Board dealt only with "B" and "C" class men not requiring any treatment, and in the great majority of cases suffering from minor disabilities which did not at the time suggest serious pensionable disability; but it was precisely this class of men who later furnished the most intricate problems set before the Pensions' Boards in New Zealand, hence the necessity for considerable care in the preliminary boarding.

Demobilisation was proceeding apace and by January, 1919, the number of troops in England and Germany awaiting repatriation was 40,000 of which 14,000 with the Division. Six ships had sailed since November the 11th, eight were due to sail in January, and nine in February, ensuring a rate of about 7000 embarkations per month. The number of ships available was quite satisfactory but strikes in the London Dockyards had

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delayed the first waves so that the programme was a little behind date, nor could it be hoped that the same volume of embarkations would be maintained.

At the end of January, 1919, the total number of sick and wounded in hospitals in England was 115 officers, 2796 O.R., of which 524 of all ranks still in British hospitals. Colonel Parkes, C.M.G., C.B.E., the D.M.S., had taken his leave of the N.Z.E.F., and, in reviewing the work of the New Zealand Medical Services overseas which he had administered during three years, admitted many shortcomings and mistakes in administration due chiefly to a lack of military experience, but which—as he states—were condoned and amended by the ever ready assistance and advice given by the Medical Authorities at the War Office, especially the D.G.M.S., General Keogh; and to the willing co-operation of the Directors of Medical Services of Australia and Canada he claimed to be much beholden for their help in matters concerning the Dominions. In these complimentary expressions he had the concurrence of all his officers of the N.Z.M.C. whose work had brought them into collaboration with the sister services of the Mother Country and the Dominions.

Colonel C. Mackie Begg, C.B., C.M.G., French Croix de Guerre, N.Z.M.C., replaced Colonel Parkes as D.M.S. But his term of office was of short duration: in January he succumbed to influenzal pneumonia after a very short illness. He had seen much service: in command of the No. 1 New Zealand Field Ambulance at Anzac, where he was slightly wounded, and received the C.M.G., while the Royal College of Physicians elected him a Fellow; later he was A.D.M.S. of the Division and ultimately D.D.M.S. of IInd Anzac Corps, afterwards the XXIInd Corps. For his work in this appointment he was decorated with the C.B. and had the French Croix de Guerre with star for the operations in the Ardre Valley in the campaign under General Godley. His long connection with the N.Z.M.C. since 1906, when he first joined the Wellington Bearer Company, his tour of duty as P.M.O. of the Wellington District, and his distinguished career in the war—the fruits of his many sterling qualities—made him alike the most experienced and distinguished of our officers. His body was laid to rest in the Walton cemetery on the 5th of February: his loss was deplored by all his many friends in the service.

Administrative control of the Medical Department in the London Headquarters was directed, during the remainder of 1919, by Lieut.-Col. B. Myers, A.D.M.S., and was chiefly concerned with

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the problems of repatriation. As regards the N.Z.M.C., repatriation was wholly dependent upon the ordered evacuation of the sick and wounded and the gradual closing of the medical units on the Continent and in England. The strength of the N.Z.M.C. just before the Armistice was as follows:—In France, 82 officers, 794 O.R.; in England, 112 officers, 426 O.R.; in Egypt, 15 officers, 99 O.R.; making a total of 209 officers, 1319 other ranks overseas;. The strength of the New Zealand Army Nursing Service was 311 N.Z.A.N.S. matrons, sisters and nurses. Including V.A.D.'s, female and male assistants attached, the combined personnel employed in the N.Z.E.F. Medical Services in Europe totalled 2605 in all. The demobilisation of this service, considered as "pivotal" could not proceed along the same lines as that of other arms, as it depended upon the rate at which the sick and wounded could be disposed of. Long service men, however, were given priority in embarking for duty with the transports, and as many long service officers as possible were released to engage in courses of instruction or post-graduate training. The special courses for officers adopted with a view to reconstruction in New Zealand were:—military orthopœdics, which included radiography and physio-therapy, splint making, plaster work and curative training; psycho-therapy and neurology; treatment of tuberculous soldiers; treatment of venereal diseases; R.A.F. medical services, pensions work; in each of these branches certain officers were trained under contracts with the Dominion Government.

The first medical unit to be demobilised was the New Zealand Stationary Hospital. The year 1918 had proved the most active of all in the history of this unit; the bed accommodation had reached 800 and the monthly admissions had varied between 700 and 1200 during the last twelve months of service in France. The hospital had served a variety of purposes in the Second Army: as a shell shock centre; as an infectious diseases hospital; as a C.C.S. during the Flanders invasion in March; as a pathological centre in connection with the dysentery outbreak in August and September; and as a general hospital with medical, surgical and specialist divisions at all times after the reconstruction of the unit at Wisques in February, 1918. Surgical teams had frequently been despatched to the assistance of the C.C.S.s during periods of heavy fighting; but useful as the work of this unit was, yet it was always a subject for regret by the N.Z.M.C. that the Stationary Hospital had not been constituted as a C.C.S. Originally raised as a surgical unit, it never had opportunity to

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fully develop its surgical strength, indeed most of the original staff of surgeons went to strengthen other N.Z.M.C. formations. Yet the opportunities afforded to medical officers with the Division of acquiring clinical experience by attachment to the Stationary Hospital were not neglected: many officers with long service in the ambulances passed in time to the unit at Wisques and helped to maintain the traditions of this much travelled and much storied hospital which was finally demobilised on the 26th December. Their last Christmas dinner in the war was eaten in haste by the staff—with pack on back ready for departure on the morrow.

The ambulances in Germany were quartered near their respective brigades: No. 1 Field Ambulance at Monheim, No. 2 in schools and a concert hall at Mulheim on the right bank of the Rhine, across the bridge of boats; and No. 3 at Frankenforst: all within easy reach of Cologne. Their Christmas dinners were served just two days after their arrival in the Rhineland. There were plum puddings in plenty, but all deplored the absence of the turkeys which transport difficulties had delayed en route: flagons of rhineish made a poor substitute, although—as duly recognised—not lacking in cheering qualities. Of those who sat at the board that day, many had broken no other bread than that of the army on any Christmas morn this five years past; and still a few who could recall Christmas junketing at tables in the open desert near Cairo or on the dingy transports slinking away from Anzac. They had toasted the day on the edge of the battlefield for four long years, and now at the close of the fifth year there was at last peace on earth and a hope of good will for all mankind.

The A.D.M.S. was established with Divisional Headquarters in the offices of the Bayer Chemical Works at Leverkusen, four miles north of Mulheim. In these very factories Bayers had been as successful in the manufacture of phosgene—normally used in the synthesis of Salol—as they were in the production of aspirin, and it was said that much mustard gas had been produced here during the war. Recalled for duty in New Zealand and temporarily attached to the Ministry of Pensions, Colonel McGavin, C.M.G., D.S.O., was replaced early in January by Lieut,-Col. Murray, C.M.G., D.S.O., as A.D.M.S., and later Lieut.-Col. H. J. McLean, C.B.E., took over the appointment.

The peace-time duties of the field ambulances were not very arduous: attention to the sick of their brigades and evacuation of the more serious cases to the casualty clearing

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stations in Cologne comprised their chief activities. Influenza lingered with the Division during January and February, but there was no other serious disease, the sickness wastage falling to 6.5 per 1000 per week evacuated to L.O.C. But there was a decided increase in the venereal diseases rate which varied between 2 and 3 per 1000 per week, as the inevitable result of garrison duties in Cologne, where syphilis seemed to be very prevalent. Inevitably the sickness wastage curve showed a rising tendency during the three months of occupation, an upward trend due to peace conditions, and reflected in the wastage graph of the Second Army. Amongst the services of the Medical Corps an important duty was carried out by a party of 4 officers and 15 O.R. under Major Widdowson, D.S.O., N.Z.M.C., during January. They formed part of the Medical Commission sent in to unoccupied Germany to collect our sick and wounded prisoners of war who were now admitted to the British field ambulances. From statements made by repatriated New Zealanders who had been prisoners it does not appear that they were subjected to avoidable hardships; food was scarce and coarse in quality, undoubtedly, but otherwise our men were spared the grosser indignities and had been treated in the hospitals as well as circumstances permitted.

Means of recreation were not deficient in the Rhineland: parties of the N.Z.M.C. armed with the "Diggers' Guide to German," a production of the Divisional Press, visited the sights, explored the Cathedral, or were ferried up the Rhine to Bohn or Coblentz. But their chief pleasure was the Opera House, where they heard in song the great Saga of our Norse ancestors—saw and heard Siegfried forging his sword and Brynhilda, daughter of Wotan, riding the winds with the chosers of the slain—saw again, as at Crèvecoeur, and at La Vacherie, the twilight of the Gods and the doom of Valhalla.

Demobilisation and the handing in of equipment and transport monopolised much of the attention of the ambulance commanders. Step by step with the reduction in strength of the Division the medical units were demobilised in turn, No. 3 Field Ambulance being the first to close on February 4th, and No. 2 Field Ambulance just a month later. Owing to difficulties in obtaining railway transport, No. 2 was obliged to part with its cherished mascot "Murphy" a donkey brought with them from Egypt, who had survived the perils of the western campaign while many of his stable companions had been killed in action. What remained

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of No. 1 Field Ambulance entrained with the last drafts on March 25th, the day on which the New Zealand Division ceased to exist.

It has been said that the New Zealand Division had failed only once in taking all its objectives, the same might be said of the N.Z.M.C. attached to the Division. Only on one occasion had any adverse criticism on the conduct of the field ambulances reached Corps Headquarters. The accusation made against them was that they had failed to clear the battle field of wounded at Passchendaele! Apart from this glorious failure the medical services of the Division bore a good name in France which they owed to the earnestness of their commanding officers, and the solidity of the rank and file. Above all, the relations of the medical branch to the combatant staffs of the Division had ever been cordial and mutually supporting. Our honoured chief, Sir Andrew Russell and the officers who in turn administered his "A" branch, Lieut.-Col. H. G. Reid, C.M.G., C.B.E., D.S.O., R.A.S.C. and Lieut.-Col. H. Avery, C.M.G., D.S.O., N.Z.S.C., had always given to the medical arm the same intelligent consideration as they devoted to other arms in the Division. Many of the distinctions awarded to our officers came at the instance of the combatant officers who were partners in the operations so commemorated.

By June, 1919, demobilisation was well forward. The closing of No. 1 N.Z.G.H. coincided with the sailing of the "*Maheno*," the last hospital ship to leave for New Zealand; 158 patients from Brockenhurst were embarked on March 11th, which completed the work of the hospital. During its stay in England this medical unit had admitted a total of 21,004 patients. The New Zealand Convalescent Hospital, Hornchurch, closed in June, No. 3 N.Z.G.H. in July, but the Venereal section did not close until August when the remaining patients, some 200 in number, were transferred to a British Hospital at Chiselden. The Mt. Felix Section of No. 2 N.Z.G.H. had closed by the end of June, but it still had some 80 beds open at the end of August, and retained at Oatlands Park the limbless, still awaiting the fitting of artificial limbs at Roehampton. In all cases medical and surgical equipment and hospital furniture and stores had been shipped to New Zealand in such quantity and of such description as seemed most useful and appropriate, the remainder was disposed of by public sales. Personnel had embarked with the departing transports. A second orthopoedic team comprising six

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officers under Lieut.-Col. P. C. Fenwick, C.M.G., had sailed by August: medical officers taking their discharge in England replaced those bound for New Zealand and at the end of this month only 33 officer patients, and 319 other ranks, of which 14 officers and 126 other ranks limbless, remained. Medical Headquarters closed at this time, leaving Major McKibbon, O.B.E., N.Z.M.C., as Medical Representative at headquarters. A few medical officers, engaged in special training in military subjects or in post graduate work, remained in England, but the total strength of the N.Z.E.F. was reduced to 404 officers, 3,275 other ranks, and by October most of these had embarked for New Zealand.

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CHAPTER XXII.

Reconstruction in New Zealand

The New Zealand Defence Department had, by 1918, attained to a high level of organisation. The war policy of the Dominion, directed by a Coalition Cabinet, was administered by a Minister of Defence of marked ability and dominant personality, Colonel the Hon. Sir J. Allen, K.C.B., M.P., whose Ministry of Defence had grown from a modest and subordinate position to one of great strength and critical importance. The various branches of the Department, that of the General Staff, the Adjutant General, and the Quartermaster General, had been enlarged and reinforced by various active boards established for war purposes and concerned with munitions, supplies, transport and recruiting. The Medical Department of the Adjutant General, Col. R. W. Tait, C.B.E., had expanded with the growth of the other branches and at the end of the Dominion military year in June, 1918, was adequately staffed and had assumed full responsibility for all the duties normally allocated to such a department. The D.G.M.S., Surgeon General R. S. F. Henderson, C.B., K.H.P., .A.M.S., had a staff of experienced officers which was composed as follows:—

D.M.S.: Col. J. R. Purdy, (D), N.Z.M.C.

D.M.H.: Hon. Col. T. H. A. Valintine, N.Z.M.C.

A.D.M.S. (Sanitary): Capt (tem. Lieut.-Col.) R. H. Makgill, N.Z.M.C.

D.A.D.M.S.: Hon. Capt. G. A. Gibbs, R.A.M.C. attached N.Z.S.C.

D.D.S.: Lieut.-Col. T. A. Hunter, N.Z.D.C.

The Consulting Surgeon in New Zealand at this date was Lieut.-Col. J. McN. Christie, N.Z.M.C., who had seen service with the Hospital Ship Marama in 1917, and had replaced Hon. Lieut.-Col. Hope Lewis, N.Z.M.C., deceased, whose first appointment as consulting surgeon dated from 1915. The appointment was directly under the control of the Director of Military Hospitals, the duties being: to inspect all returned soldiers in public hospitals and sanatoria, whether in or out patients, and to forward reports on these patients showing

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whether they required further treatment or whether they should appear before a medical board. Besides the Staff at Headquarters there were: four A.D.'sM.S., one in each military district; the medical officers sitting on recruiting or invaliding boards; and the medical officers attached to various hospitals, camps, and depots. The New Zealand Army list at this period showed over 500 officers on the strength of the N.Z.M.C., of which nearly one-half with the N.Z.E.F. No serious difficulty, then, had arisen in supplying the necessary quota of officers to the N.Z.E.F., nor in filling the various appointments required to conduct the home services. From our Depot at Awapuni, in command of Lieut.-Col. Gabites, N.Z.M.C., a constant stream of partly trained recruits was available to fill the ranks of the Corps, both in the Dominion and abroad.

An important change in medical administration came about in March, 1918. The dual control exercised by the Defence and the Public Health Departments over sick and wounded returned soldiers was, by resolution of Cabinet, abolished and the sole responsibility for the after care and treatment of both discharged and undischarged disabled soldiers was handed over to the Defence Department. The dual system in which the Chief Health Officer and the D.G.M.S. were co-equal failed, not in any way through lack of mutual understanding between the medical officers concerned, but because the arrangement was cumbersome, uneconomical, led to considerable delay in execution and was not productive of military efficiency.

That the system was faulty was admitted by all parties early in the year. As evidence of the cumbersome nature of the existing scheme, the transfer of a military patient from one civil hospital to another is cited. On transfer of a military patient the medical superintendent of the civil hospital concerned communicated with the Public Health Department, whose chief, as D.M.H., if he approved of the transfer (in this he would be guided by the Consulting Surgeon), and if a bed was available in the hospital of destination, referred the matter to O.C. Base Records, who in turn directed the O'sC. military districts concerned: one, to issue the necessary rail warrants, the other, to warn the civil medical superintendent of the hospital of destination. At Rotorua Sanatorium and Military Hospital the system was to be seen in its most complex manifestation. The Sanatorium and Balneological Station was an institution controlled by the Tourist Department. The Medical Superintendent, Dr. Herbert, was an officer of the Tourist Department, his salary

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being paid by them, but his sanatorium, in as much as it supplied the needs of the district as a General Hospital, came under the partial control of the Chief Health Officer; was in a sense one of the civil hospitals provided for under the Hospitals and Charitable Institutions Act. When military patients were first sent to Rotorua in 1915, it soon became evident that, if discipline was to be maintained, some military representation was necessary; as a compromise, the Medical Superintendent was given temporary rank in the N.Z.M.C. and Medical N.C.O.'s and O.R. were attached for duty. With the erection of the extension at Pukeroa Hill—at first two polyhedral wards—a combatant officer, Lieut.-Col. Newall, as we have seen, was attached as Commandant, when the new wards, now known as King George Vth Military Hospital were opened in 1916. The Medical Superintendent was now caught between many fires: the Tourist Department which paid him, the Public Health Department which controlled him, and the Defence Department by which he was disciplined. A more unworkable intolerable situation could hardly be imagined, yet compromised with and endured with singular fortitude by all concerned.

Public hospitals in New Zealand are supported by:—(1) Rates levied in the hospital districts; (2) A Government Subsidy proportionate to the amount levied by local taxation; (3) Fees payable by patients; and to a certain extent by voluntary contributions. The public hospitals are administered by the Hospital and Charitable Aid Boards, lay bodies and voluntary workers who employ a medical superintendent and a staff to administer the hospital and provide treatment for the patitents. In the working of the Hospital Boards the Inspector of Hospitals, also the Chief Health Officer of the Dominion, exercises an advisory and controlling function and has a certain prerogative in guiding the boards in in their selection of medical superintendents, assistants and nursing staffs. The medical superintendents are part time or whole time as is required by the size of the particular institution. But the superintendents, being officers of the Hospital Board, are certainly more under the control of the Board than they are beholden to the Public Health Department. Good will between all parties is essential for the smooth running of the Act and in the war period the best conditions prevailed. The boards animated by a real patriotism, co-operated most energetically with the Defence Department in providing accommodation and treatment for the returned soldiers. The link between the Defence Department and the Hospital Boards was the Chief Health Officer.

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Under the new arrangements whereby the Defence Minister assumed control over military patients, it was still necessary to make use of the hospital accommodation provided by the civil hospitals. In order to co-ordinate the work, Colonel Valentine was temporarily lent by the Public Health Department to the Defence Department and became a whole time military officer under the D.G.M.S. King George V Hospital at Rotorua and the Sanatorium at Hanmer, and all convalescent homes hitherto administered by the Public Health Department became military institutions. Another change in administration was necessary: discharges of returned soldiers still needing treatment had to be delayed indefinitely and, following the precedent of other Dominions disabled soldiers already discharged from the service required to be reattested prior to admission to hospital for treatment of recurrent disabilities due to wounds or war service. These measures essential to the maintenance of discipline were brought into force during the year.

Close consideration had been given by the D.G.M.S. to the necessity for providing adequate orthoepadic treatment for returned soldiers and provision for the special treatment of tubercular patients, and those suffering from the war neuroses. Public attention had been sharply focussed on these matters early in 1918, and shortly after the new arrangements came into force provision was made for the reception of the first orthopaedic team at Christchurch Hospital and for the erection of military sanatoria for the treatment of phthisis. In Dunedin, Lieut.-Col. Barnett, C.M.G., N.Z.M.C., who had now resumed the Chair of Surgery at the Otago University was instrumental in organising a preparatory scheme for the establishment of an Orthopaedic Centre at the Dunedin Hospital. At the instance of the D.G.M.S., Lieut.-Col. Mill, N.Z.M.C., recently returned from the United Kingdom, forwarded a report after a tour of inspection. The report which was later endorsed by Colonel Wylie, N.Z.M.C., advised that at least 3000 beds would be required; that at present there was a lack of accommodation, lack of trained medical personnel, and especially an inadequate equipment for physio-therapy. The establishment of two large central hospitals under military control, one for each Island, was recommended, and it was strongly urged, on the advice of Sir Robert Jones, who had personally interested himself in the matter, that none but trained military orthopaedic specialists should undertake the work of surgical reconstruction in New Zealand.

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It had been intended to send the first orthopædic team to King George V. Hospital at Rotorua, but as Christchurch was more central and offered superior accommodation, the unit was established at Christchurch Hospital in a new block known as the "Chalmers" Wards donated by the estate of the Chalmers family of Ashburton and appropriated to military uses with the consent of the donors. The local Hospital Board, whose medical staff was much depleted by the war, had early realised the advantages their institution would derive from the attachment of the orthopaedic unit more especially in developing their civil orthopaedic work and in the reorganisation of their departments. They agreed to do all in their power to make the conjoint work a success and in October, 1918, Colonel Wylie and his team were busily engaged in opening their various departments.

The close of the year 1918, was a disastrous period of failure for the camp sanitarians; statistics up to November had yielded a promise of a healthier year even than 1917, and encouragement in a belief in the efficacy of the very stringent preventive measures in force. But at the end of the year the results shown did not warrant any great assurance in the value of the sanitary measures adopted to exclude epidemic disease. The average strength of the camps in 1918 had been 9,181, with a total population of 24,434. Of this number 11,578 had been admitted to hospital; the hospital admission rate gave a figure of 36.81 constantly sick as compared with 12.49 for 1917. There were 295 deaths recorded in the camps, equivalent to a mortality of 12.07 per 1000 or 32.13 per 1000 on the average strength. These were the worst figures yet furnished in the annual health reports of the camps, but 73 per cent. of the sickness was due to influenza and of the deaths, 287 were caused by the later influenza epidemic.

There had been a preliminary wave of mild influenza in August and September, but in the first week of November a secondary wave of extraordinary severity swept over the camps. The first outbreak although it seemed to confer some slight immunity, was not attended by any marked incidence of pulmonary complications and it seemed to the medical officers that the throat swabbings were fully justifying their existence. But nothing could have warded off the explosive virulence of the main epidemic in New Zealand which so curiously coincided with that of the Division in France, the N.Z.E.F. camps in England and the world wide pandemic of late October and November. On the 11th and 12th of October troopships arriving in Auckland reported 80 cases of influenza on board. The

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disease spread to small camps in Auckland and to the civil population and, by the 28th of October, was fully declared. Travelling southwards by coastal routes and troop trains it reached Wellington and the large camps between the 2nd and 4th November. Disseminated from the ports the pandemic affected the South Island a week later and strangely decreasing in mortality rate as it passed southwards, it died out at the end of November as suddenly as it had sprung into being. New Zealand had never suffered such a pestilence; records of previous epidemics of a wide spread nature were preserved, one in 1853 which affected the British troops and caused many deaths, and again in the years 1890 to 1894, there had been outbreaks of some severity but the total of all deaths from influenza in all the years from 1872 onwards was greatly exceeded by the mortality of the year 1918. Of 5,580 cases admitted to the civilian hospitals, 1,604 died; a case mortality of nearly 22 per cent. while it is estimated that over 6,000 deaths attributable to the influenza were registered during the short duration of the pandemic. Unprecedented in extent and virulence, the disease swept upon the camps striking down about one half of the population during the first 10 days. There was an incidence of 11 per cent. of serious pulmonary complications and in those so affected, a 42 per cent mortality. The deaths amongst the troops numbered 287. It was of brief duration, all was over in 18 days, but during the crowded weeks of the visitation the N.Z.M.C. staffs, depleted by sickness and death in their own ranks, wrought unceasingly with splendid devotion assisted by volunteers from the combatant ranks who displayed a quiet heroism, very honourable very praiseworthy, in their unwonted terrible and dangerous work. Five N.Z.M.C. officers, one sister, N.Z.A.N.S., and at least 14 O.R. N.Z.M.C. gave up their lives in fighting the epidemic. Amongst the officers was one well known to us, Lieut.-Col. Mathew Holmes, N.Z.M.C. Invalided at the end of 1917, this officer, the first to embark a medical unit in the Great War, held the appointment of A.D.M.S. Wellington District after his return to New Zealand. He had given good services to the New Zealand Forces in Samoa, Egypt and in France, but constant ill health, ever militated against that full participation in the active work of the N.Z.M.C. which he so much desired.

Bacteriological reports and pathological findings in the epidemic differed little in New Zealand from those compiled in European centres. The *Bacillus of Pfeiffer* was very prominent in the first wave, but not so frequently observed in the secondary

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wave when the *pneumococcus*, a *streptococcus* and *gram negative cocci* seemed to be predominant. One interesting investigation made by Lieut. Waters, N.Z.M.C, Bacteriologist at Trentham, is worth recording. He exposed blood-agar plates in the wards and on the verandah of the hospital, others in the canteen and cinema hall of the camp. No cultures of pathological significance grew on the plates exposed in the hospital, but on plates from the picture theatre and more especially the canteen, copious growths of the characteristic organisms were identified. This promising inquiry into the vital question of modes of infection was most unhappily interrupted by the onset of influenza in the investigator. No preventive measures could control the spread of such an epidemic, but the despatch of the 43rd Reinforcements was cancelled; all movements of troop trains were stopped; the camps were rigidly quarantined, and a daily pilgrimage was made to the inhalation chambers. Shortly after Armistice demobilisation of the camps and home services commenced, but the epidemic delayed and lengthened the process and entailed an unusual amount of extra work on the medical service.

During 1919, important changes in administration took place. General Richardson on his return to New Zealand was appointed General Officer in charge Administration, an office not previously constituted in the Defence Department. Major General Henderson, having completed the term of his extended engagement with the Dominion Government, relinquished his appointment as D.G.M.S. at the end of March and on his departure received the public thanks of the Government for his valued services and was awarded the K.C.M.G. His duties were assumed by Brigadier General McGavin, C.M.G., D.S.O., N.Z.M.C., who returned to New Zealand in May. As the gradual return of medical officers, who had held important appointments in the N.Z.E.F. overseas, supplied the Director General with a staff of skilled and experienced subordinates, the senior officers on loan from the Public Health Department were returned to their civil duties. Dr. T. A. Valintine, C.B.E., D.P.H., relinquished his appointment as D.M.H., and returned to his duties as Chief Health Officer, and with him went Dr. Makgill, D.P.H., his director of Hygiene, who had been A.D.M.S. Sanitary. To both these medical gentlemen the Defence Department was much beholden for strenuous services during the war years. Dr. Makgill had directed the sanitary policy of the camps and had elaborated the ingenious preventive measures against epidemic disease already detailed, while his annual reports on the health of the troops are not only a testimony to

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his industry and learning, but form a valuable commentary on contemporary sanitary and epidemiological knowledge.

The first and most important readjustment to be made by Brigadier General McGavin was the closing of a large number of small "war hospitals" or convalescent homes and the concentration of service patients in specialised military institutions. Owing to the over-crowding of the civil hospitals and the inadequate provision of military hospitals prior to 1918 the local Patriotic Bodies in the larger towns had established a number of small soldiers' hospitals and convalescent homes which by reason of their scattered distribution were almost impossible to administer or to control. The maintenance of discipline and the provision of special treatment were both considerations of urgent importance and there was also evident the necessity for a more accurate classification and sorting of the patients domiciled in these units.

Already in 1918 our orthopædic specialists sent out from England had reported unfavourably on the conditions existing in most of the larger hospitals, and this more especially as regards the facilities provided for physio-therapeutic and electrical treatments and the manufacture of splints and corrective appliances. It was noted, for instance, that many cases of functional paresis had been confused with the organic lesions and that both had been subjected to electrical treatments not suited to the respective conditions—many gun-shot injuries of peripheral nerves dating from 1915 and 1916 required treatment by nerve suture.

The first necessity was classification: with this object in view a travelling medical board was set up by the D.G.M.S. with Col. J. McNaughton Christie, C.B.E., N.Z.M.C., as chairman. The duties of the board were to visit all the outlying homes and recommend patients for transfer to the appropriate military institutions.

Owing to the fervour of local patriotic feeling, considerable opposition was offered to the closing of the smaller War Hospitals and Convalescent Homes. The Patriotic Bodies had many good reasons to advance for keeping their respective units open but the Defence Minister, Sir James Allen, was obdurate, he demanded efficiency at any cost and approved of a reorganisation of the military hospitals on the lines of similar formations in the United Kingdom. By means of the Travelling Medical Board the patients were ultimately sorted out and drafted to the now enlarged and specialised military hospitals;

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but nearly two years elapsed before all the smaller units were finally closed.

Amongst the first of the specialised units to be constituted in 1919 was a neurological centre for the treatment of the war neuroses. Queen Mary's Military Hospital at Hanmer Springs, in the South Island, had been used as a Convalescent Home since 1915. At first a balneological station under the Tourist Department, possessing a hot sulphur spring, a resident medical officer and a small sanatorium, it admitted convalescents of all categories; but during the war, until 1918, it was under the control of the Public Health Department. Later it assumed a more military character and in 1918 had a combatant officer as commandant, with N.Z.M.C., N.C.O.'s and orderlies and a military medical officer. Major Bernau, N.Z.M.C., had followed Captain Hendry, N.Z.M.C., and was succeeded by Major Brewis, N.Z.M.C., but on the opening of the hospital as a neurological centre, it was commanded by a medical officer, Lieut.-Col. D. E. Fenwick, N.Z.M.C., recently Registrar and Chief of the Medical Division of No. 1 N.Z.G.H. An objectionable feature in the disposal of "shell shock" cases in New Zealand prior to 1918, had been the treatment of the more serious cases in convalescent homes adjacent to and controlled by the Mental Hospitals Department. Public opinion was very sensitive to the removal of alleged "shell shock" patients to mental hospitals, so much so that after certification, the soldier mental patients were accommodated in separate "military" wards where they received the same gifts and minor attentions as the inmates of other hospitals as far as was permissible. But at Hanmer none of the more serious cases were to be admitted; it was from the first clearly determined that the hospital was not to be a "borderland" home nor a place for the treatment of the milder psychoses but a centre for dealing rapidly and effectively with the many cases of hysteria, neurasthenia and psycho-neurosis which had accumulated during the war. Hanmer was well organised in its new work when Major Chisholm, N.Z.M.C., one of the officers specially trained in England under Sir James Mott, took command of the Hospital in 1920.

The proposal outlined in March, 1918, for the formation of military orthopaedic hospitals in the four centres, included an Orthopædic Hospital at Rotorua. The Convalescent Home known as King George V. Hospital had been in existence since 1916. Lieut.-Col. Herbert, N.Z.M.C., Superintendent of the Sanatorium, had enlarged the Physio-therapy Department and had installed

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Vocational Workshops during 1917. A new Hospital had been erected at Pukeroa Hill overlooking Lake Rotorua and the hot pools at Ohinemutu in 1916, and as it was decided to separate the new hospital from the Sanatorium an extensive building scheme was embarked on late in 1918, when Lieut.-Col. Mill, N.Z.M.C., assumed command. He was succeeded by Lieut.-Col. Bernau, N.Z.M.C., the following year, and in 1920 the unit received all the patients from the Military Annexe at Auckland, becoming a fully equipped military orthopædic hospital of 300 beds.

At the Civil Hospital in Auckland, additional wards for military patients had been established at the end of 1915. The buildings where these patients were accommodated, known as the Annexe, were controlled by the Superintendent, Lieut.-Col. Maguire, N.Z.M.C., who had served with the New Zealand General Hospital in Egypt, but had been recalled to the service of the Civil Hospital. In the March, 1918, proposals, the Annexe was destined to be expanded so as to form a military orthopædic hospital. The institution was inspected and reported on by Colonel Wylie, then Inspector of Military Orthopædics, and it was decided that the Defence Department should assume control. Lieut.-Col. Mill, therefore, in June, 1919, took command of the military unit and was later succeeded by Lieut.-Col. Murray, C.M.G., D.S.O., N.Z.M.C., in September.

The Annexe was closed in March, 1920, and the military patients transferred to Rotorua where the new buildings were now available. The change of site was fore-shadowed in the original policy of 1918, the building scheme had been in part, completed at Rotorua and economy in medical officers and in administrative expenditure in a great measure dictated the change. Ultimately the Annexe was available as a physio-therapy department of the Civil Hospital and a portion was appropriated as a Venereal Clinic for males and females, controlled by the Hospital but supplied by the Public Health Department with a medical officer: Major Brown, N.Z.M.C., late Officer in charge of the V.D. Section of No. 3 N.Z.G.H., Codford, was appointed, while the other officers of his staff who had received special training in England were attached to the Civil Venereal Dispensaries at the chief centres.

In June, 1919, the Camp Hospital at Trentham was enlarged and organised as a general hospital of 500 beds. Colonel Wylie, following Lieut.-Col. Mills, had command, and supervised

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the necessary alterations and additions. The existing hutments were adapted by means of a connecting corridor with sanitary pavilions attached. Special departments, for physio-therapy, X-ray and plaster work, were provided for and extensive splint shops, curative and vocational training workshops, and gymnasia were established. The Surgical Division at Trentham, mainly orthopædic, was in charge of the second Orthopaedic Team under the direction of Lieut.-Col. Stout, D.S.O., late Surgical Specialist at No. 1 N.Z.G.H..

At Featherston, in the Camp Hospital, a centre for D.A.H. and C.P.D.I. had been formed; the latter designation a nomenclature including all undiagnosed cases of chronic pulmonary disease of indeterminate character, a class like D.A.H., in need of further sorting. A Venereal Division was associated with this Military Hospital which was commanded by Lieut.-Col. McLean, C.B.E., In 1920, Featherston Military Hospital was closed, the cases transferred to Trentham with a proportionate staff and the officer commanding took up the appointment of A.D.M.S. Central Command.

A sanatorium for the treatment of tubercular soldiers had been under consideration since 1918. Situated near Waipukurau, in the Hawkes Bay District, in an ideal climate, and on a hill named by the Defence Department "Puke Ora," the hill of health, the institution was opened late in 1919, and command was taken by Major H. Short, O.B.E., one of the officers specially trained in England for this important work. About 130 beds were available, of which the greater part in individual shelters, but additions were in progress and it was not until 1920 that the institution was fully developed. Similarly in the South Island, a Military Annexe to the existing civil sanatorium at Cashmere Hills, near Christchurch, had been provided where Major Aitken, M.C., N.Z.M.C., also a trained specialist, took command. By January, 1920, the number of soldiers of the N.Z.E.F., who had been returned to New Zealand with a diagnosis of Pulmonary Tuberculosis, positive or suspect, was 987; of these, 504 had received treatment in sanatoria, while 483 had been discharged. It had been found that a high proportion of the soldiers returning from England with the diagnosis P.T.B. had so improved by the sea voyage as to present neither symptoms nor physical signs of disease on arrival, and the fact that so many had not required treatment suggested the probability that the original condition was not tubercular. On the other hand 25 per cent. of the cases designated C.P.D.I. presented signs of tubercular infection of the

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lung and were drafted to the military sanatoria where there was ample accommodation for all suitable cases. The advanced cases were treated in other hospitals or shelters at their own homes, while the Repatriation Department undertook the after care of the convalescents at a special farm colony where training could be acquired in outdoor occupations suitable to this class of invalid. No problem was more beset with difficulties than this, the repatriation of tubercular soldiers; the chief difficulty—not appreciated by the layman—being diagnosis.

At the Chalmers Military Hospital, Colonel Wylie was thoroughly established early in 1919. All orthopædic departments were well organised and indeed served as a model for the other similar institutions. At Timaru, South of Christchurch, a small military hospital was established in 1919, under the command of Major Ulrich, N.Z.M.C. At this centre, military orthopædic work was developed by the commandant, who had in 1917 been chief of the Surgical Division of the New Zealand Stationary Hospital, and Major Unwin, N.Z.M.C., who held a similar appointment at No. 2 N.Z.G.H., Walton. At Dunedin Hospital, during 1919, the military wards acquired a greater degree of efficiency on the arrival of the New Zealand Section of the "Jaw" Hospital, Sidcup, under Major Pickerill and his assistants, and the attachment to the staff of Major Renfrew White, N.Z.M.C., late of the R.A.M.C., a graduate of Otago University, whose post graduate training in England had been orthopædic surgery. Under these officers a military surgical unit, with a full range of orthopædic departments, was organised, capable of undertaking all classes of reconstructive work.

On the medical side, as we have noted, the tubercular soldier and the "neurological" type had been provided for. As a further development a convalescent camp was established at Narow Neck, Auckland, whereto many doubtful cases of lung infection and D.A.H. were drafted. This unit, under the command of Lieut.-Col. Maxwell Ramsay, N.Z.M.C., was visited periodically by the Tuberculosis specialist, Major H. Short, N.Z.M.C., and a final disposal of this troublesome class was ultimately made. Many of the D.A.H. cases passing to Trentham were disposed of to Hanmer after close investigation. Lieut.-Col. Fenwick, N.Z.M.C., was appointed Consulting Physician to Trentham in 1920. The Medical Division then was organised by Major G. H. Robertson, N.Z.M.C., who had specialised in cardiology in England. To this Division all cases of D.A.H. and war neurosis were sent from the

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North Island and very large numbers drafted thence to Hanmer for psycho-therapy, or otherwise disposed of. The Medical Division at Trentham became a diagnostic centre and in a sense filled the place of the special Boards in England. Periodical visits by the tuberculosis specialist ensured adequate co-ordination of the work of sorting the doubtful chest conditions and selecting cases for sanatorium treatment. In June, 1919, the number of service patients under treatment was 4,831, of these, 1890 were in-patients, but by May, 1920, the number had fallen to 3,057, a reduction chiefly noticeable amongst the out-patients. The number of returned soldiers at this time hospitalised was 1,581. The out-patients were provided for in the large centres by garrison dispensaries and massage departments associated with the office of the Command A.D.M.S., and in the provincial towns by the local hospitals, many of which had returned N.Z.M.C. officers on the staff.

Final demobilisation of the N.Z.M.C. was practically completed by the 30th April, 1920, but the medical personnel retained by the Defence Department was transferred to a new formation, the New Zealand Army Medical Department, drawing the same rates of pay as existed in the N.Z.E.F. with which almost all the medical officers retained and nearly 50 per cent. of the N.C.O.'s and men had served overseas. The Department in 1920 numbered 40 officers, 8 commissioned quartermasters or other non-medical officers, 459 N.C.O.'s and other ranks, 210 N.Z.A.N.S., or 900 in all—including male and female assistants.

In the process of reconstruction we are now chiefly concerned with the military hospitals alone, which from 1920 onwards were: King George V., Rotorua, with 300 beds; Trentham Military Hospital, 500 beds; the two Military Sanatoria at Pukeroa and Cashmere Hills; the Neurological Centre at Hanmer; and the Convalescent Camp at Narrow Neck, Auckland. The Civil Hospitals at Dunedin, Timaru and Christchurch absorbed the military staffs in 1920, and developed their civil orthopædic work: there was ample material as a serious outbreak of poliomyelitis in 1916 had left us many crippled children for the full treatment of whose deformities there had been up till now no adequate provision. At Wellington Hospital, which had closed its Victoria Military Ward when Trentham was organised in 1919, there was as yet no provision for establishing an orthopædic division. With the gradual disposal of ex-service patients, the two military hospitals opened their wards to civilians, children mostly. King George V. Hospital had soon over 100 beds occupied by crippled

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children and Trentham Hospital provided for similar patients in the Wellington district. The association of the crippled children with the disabled soldiers proved a very happy one, helpful to morale, promoting discipline, but above all a stimulus for the orthopædic teams already surfeited with the military reconstructive work and not a little despondent at the results attending their efforts, which in 1918, in the first vehemence of orthopædic ardour, had promised such splendid achievements. The crippled child, an emotional problem, and one offering an alluring promise of better and speedier results, did much to energise the war weary workers. In stimulating interest in civilian orthopædic work, Colonel Wylie, who on demobilisation, was appointed Director, division of hospitals in the Public Health Department was a principal mover, and his zeal in reorganising the civilian hospitals and furthering their development were everywhere productive of progress.

In the work of medical reconstruction, the voluntary aid societies and patriotic bodies gave valued assistance. The Red Cross Society, ever indefatigable in its activities, on behalf of disabled soldiers, assisted in the hospitals, the sanatoria, and convalescent homes in providing recreation rooms and a wealth of comforts for the patients. No less active in peace than in the field, the New Zealand Y.M.C.A. supervised the picture theatres, and institutes attached to the hospitals, which did so much to relieve the tedium of prolonged orthopædic treatment. And, again, the Salvation Army gave willing help in a like manner. The district patriotic bodies were ever ready to relieve the temporary hardships that beset the disabled soldier in his transition from convalescence to civil employment; and on the concerted efforts of these bodies aided by the vocational training staffs and the Repatriation Department, much of the success of the work was dependent.

A gradual dispersal of the medical personnel of the N.Z.A.M.D. proceeded in step with the reduction in the number of ex-service patients under treatment. At the close of the military year in June, 1922, the total number of in-patients was 920; while the out-patients numbered 756; or 1,676 ex-service patients in all. During the year the following military medical institutions had been handed over to the Department of Health: Pukeroa Sanatorium, on 13st July, 1921; King George V. Hospital, 20th October, 1921; Queen Mary's Hospital, 19th January, 1922; Trentham Military Hospital, 31st March, 1922; Cashmere Hills Sanatorium, 31st May, 1922. The treatment of out-patients at

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the garrison dispensaries, previously controlled by the A.D.'sM.S., was now undertaken by the civil hospitals. Trentham Hospital was finally closed at the end of 1922. The Wellington Hospital organised an orthopædic division, took over the few remaining civil and military patients, and absorbed a proportion of the Trentham staff and equipment. Already several of the medical officers, who were part time at Trentham, were on the staff as honourary surgeons and physicians at the Wellington Hospital so that there was no lack of continuity of policy and direction in the work of reconstruction. The two military sanatoria became civil institutions, their staffs being absorbed into the Public Health Service, and the same course followed in the case of King George V. Hospital and Queen Mary's Hospital which became the first civil institution established in New Zealand for the treatment of functional nervous diseases.

At each of the four centres, homes were established for very chronic or incurable ex-service patients. The Evelyn Firth Home at Auckland; the Rannerdale Home at Christchurch, and the Montecillo Home at Dunedin, each controlled by the D.G.M.S. subsidised by the Defence Department but administered and aided by the Red Cross Society. At Trentham the small cottage hospital with 20 beds remained open as the Red Cross Home pending transfer of patients to a new site in Wellington. Surgical treatment was provided by the local civil hospitals and the surroundings and amenities of the homes were made attractive and agreeable by the known zeal and generosity of the Red Cross Society.

The workshops for the manufacture of artificial limbs and surgical appliances which had been established by the Defence Department at Dunedin, Christchurch and Auckland, were handed over to private firms constituted by returned soldiers who, in the majority of cases, were limbless men specially trained under the vocational schemes, or, in the case of the splint shops, to the respective Hospital Boards. At Wellington the artificial limb factory remained under the control of the Defence Department. The Military Medical Stores branch, under Major Gibbs, continued to supply not only the military wants but the requirements of various Government departments and many of the civil hospitals.

Finally arrangements were made and became effective in July, 1922, whereby the medical treatment, and the other medical activities in relation to service patients should be carried out by the Pensions Department so that co-ordination of medical treatment and pensioning might be more completely and economically

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effected. The D.G.M.S., Major General Sir Donald McGavin, C.M.G., D.S.O., in addition to his military duties, was appointed Medical Administrator of War Pensions, so ensuring continuity in administration and freeing the Defence Department from all further responsibility with regard to ex-soldiers.

So, in one way or another, the N.Z.M.C. officers were repatriated: many returned to private practice; some took up whole or part time service with the Pensions or the Public Health Departments or other medical branches of the Civil Service; a few became superintendents of civil hospitals; many were attached to the staffs of these hospitals and continue to supervise the after care of disabled soldiers. In the organisation of the New Zealand Medical Services for the Great War, able help had been given by the civil medical officers of other departments of the State, by the hospital boards and their hard worked staffs, and by the civilian practitioners recruited into or co-operating with the Army Medical Department. How, in a measure, these services were repaid I have attempted to show. Each trained medical officer of the N.Z.E.F. brought back with him from overseas some special knowledge or skill which was of immediate avail to the civil population and so the profitable lessons taught by the war became a powerful uplift to the civilian medical organisations of the Dominion. Not alone the officers of the N.Z.M.C. but the rank and file also played an important part in the after war medical reorganisation, as radiographers, laboratory assistants, male nurses, masseurs, and as employees of the civil hospitals or the state departments engaged in medical work.

Of the N.C.O.'s and men of the N.Z.M.C. who served in the Great War much more could have been written that is honourable and worthy of all praise: of their devotion to duty in the field, at the bases, at sea in the hospital ships, and in New Zealand. Of their individual brave deeds but little has been reported—I think they would have it so. But this at least must be said: whatever praise the New Zealand Medical Services may have won in the Great War was, in greater part, earned by the soldierly conduct of the non-commissioned officers and the men of our Corps.

Of our comrades who are dead, whose names are here inscribed, those killed in the field or by disease, our common foeman, it is our hope that their sacrifice may shine forth if but dimly in this book, for those who coming after—perhaps engaged in a like adventure—may read this, their faltering epitaph.

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APPENDICES.

Appendix I.

Nominal Roll and Appointments of Colonial Medical Officers. 1845 - 1860.

Name	Regiment or Unit	Date of Commission	Remarks
Davies, W. ..	Auckland Militia	11th April, 1845	Died prior to 1860
Fitzgerald, T. ..	Wellington Militia	11th April, 1845	Left Colony
Wilson, T. ..	Nelson Militia	9th June, 1845	
Philson, Thos. Moore M.D. ..	Auckland Militia	8th Dec., 1856	Succeeded Davies, was late assistant Surgeon 58th Regt.. Senior Surgeon 1st Battalion Auckland Milita, 16th April 1860.
Sealey, W. B. ..	Taranaki Militia	29th June, 1859	(Resigned)
Rawson, Thos. E. ..	Taranaki Militia	29th June, 1859	succeeded Sealey
France, Chas. ..	Wellington Regt.	12th Mar., 1860	
Weeks, Henry ..	2nd Batn. Auckland	4th June, 1860	
Tuke, B. ..	Militia Regt. Wanganui	28th May, 1860	
Meredith, H. Price	3rd Batn. Auckland Militia Regt.	5th June, 1860	
Renwick, Thos. ..	Nelson Regt. Militia	28th July, 1860	
Mussen, Philip ..	Wanganui Vol. Cavalry	5th Sept., 1860	
Donald, Wm., M.D.	Canterbury Rifle Vols.	22nd Oct., 1860	

The Army List of 1861 shows four additional names:

Goldsboro, Chas. F.; Assistant Surgeon 1st Auckland Battn. Militia Regt.

Giles, Joseph; Forrest Rifle Vols.

McGauran, Thos.; Assistant Surgeon, 1st Battn., Auckland Militia Regt.

Dalliston, Jas. Joseph; Auckland Rifle Vols, "Victoria" Coy. This officer was appointed P.M.O. Colonial Troops in 1863; the appointment lapsed in 1864.

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APPENDIX A.

I. N.Z.M.C. STRENGTH AND CASUALTIES.

TABLE I

Numbers of Medical troops embarked in New Zealand for overseas service from the outbreak of war to 12th November, 1918.

Unit	Officers	O.R.	Total
To Divisional Medical Units ..	249	2,409	2,658
To N.Z.M.C. unattached	57	22	79
To New Zealand Hospitals	20	313	333
To Hospital Ships	69	504	573
Totals	358	3,248	3,633

TABLE II

Distribution of N.Z.M.C. on 12th November, 1918

Unit	Officers	O.R.	Total
Headquarters, London	7	74	81
Hospitals and Depots in U.K. ..	105	352	457
Division, Hospital and Base in France	82	794	876
Egypt	15	99	114
Hospital Ships	19	140	159
Totals	228	1,459	1,687

TABLE III

Casualties in the N.Z.M.C. embarked for Service overseas.

Unit	Officers	O.R.	Total
Killed in Action	9	73	82
Died of Wounds	3	50	53
Died of Disease	7	49	56
Accidental Deaths	2	8	10
Wounded	35	426	461
Totals	56	606	662

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II. N.Z.M.C. Killed in Action—Died of Wounds—Died of Disease. Accidental Deaths.

3/1379 Allan, Make, Pte. Died of Disease. 23/6/18. New Zealand
3/2609 Anderson, Hubert Calder, Pte. Died of Wounds. 23/10/17. France.
3/163 Andrus, Henry, Cpl. Died of Disease. 10/9/18. United Kingdom.
3/1752 Bailey, Joseph, L/Cpl. Killed in Action. 16/9/16. France.
3/6 Baker, Geoffrey Hugh, W.O.I. Drowned. 23/10/15. Salonika.*
3/2882 Ballantyne, David Inglis, Pte. Killed in Action. 12/10/17. France.
3/313 Batchelor, Ferdinand Campion, Lieut-Col. Died of Disease. 31/8/15. New Zealand.
3/165 Bates, Ernest John, Pte. Died of Wounds. 4/10/17. France.
3/983 Bealing, Ernest Charles, Pte. Killed in Action. 25/11/17. France.
3/306 Begg, Charles Mackie, Colonel, C.B., C.M.G. Died of Disease. 2/2/19. United Kingdom.
3/1754 Bell, Frank Beauchamp, Pte. Died of Disease. 22/5/16. France
3/156a Bell, James Alexander Terras, Capt. Died of Disease. 29/12/14. Egypt.
3/562 Benfield, Frederick Christopher, Sgt. Died of Disease. 3/3/16. Salonika.
3/208 Bennet, James William, Pte. Killed in Action. 11/6/15. Gallipoli.
3/2018 Bennett, Percy Douglas, Pte. Died of Disease. 9/11/16. France
3/2152 Benzie, Sydney James, Pte. Died of Disease. 2/12/18. New Zealand ex France.
3/834 Beswick, Albert Edward, L/Cpl. Died of Disease. 26/10/15 Malta ex Egypt.
3/564 Bird, James Samuel, Pte. Drowned. 23/10/15. Salonika.*
3/2744 Black, Colin Buxton, Pte. Died of Wounds. 15/10/17. France.
3/1824 Blackmore, Henry John, Pte. Died of Disease. 3/8/18. New Zealand.
12/1556 Blaker, Clement, Pte. Killed in Action. 12/10/17. France.
3/534 Bogle, Gilbert Vere, Capt. Killed in Action. 17/9/16. France.
3/102a Bonnin, Arthur Edward, Pte. Died of Disease. 26/8/15. Egypt.
3/2344 Boock, Bertram, Staff-Sgt. Died of Disease. 10/11/18. New Zealand.
29347 Booker, John William, Pte. Died of Disease. 22/11/18. New Zealand.
3/3050 Boswell, L. D., Pte. Died of Wounds. 12/10/17. France.
3/1675 Bowden, Alfred John, Pte. Killed in Action. 12/10/17. France
3/1239a Bowell, Frederick Thomas Arthur, Pte. Died of Disease at Sea en route to New Zealand. 13/2/17.
64615 Bradley, Richard Henry, Pte. Died of Wounds. 30/10/18. France.
3/1687 Briggs, Reginald Arthur Edward, Pte. Died of Wounds. 25/8/18. France.
3/1688 Brown, James Scott, Pte. Killed in Action. 21/9/16. France.
3/388 Butler, Alexander Edward, L/Cpl. Died of Wounds. 5/10/17. France.
3/2698 Butler, Richard, Pte. Died of Disease. 14/12/17. France.
3/3136 Butler, William Henry, Pte. Died of Wounds at Sea ex France. 13/6/18.
3/3805 Byron, Clarence Hedley, Pte. Killed in Action. 6/10/18. France.
3/761 Cameron, James Muir, Pte. Died of Disease at Sea. 8/12/16. Staff H.S. "Maheno."
3/1676 Carr, Wilfrid Gladstone, Cpl. Died of Wounds. 29/12/17. France.
3/1763 Caughlin, James, Pte. Died of Wounds. 13/10/17. France.
3/84 Chadwick, Roland, Sgt. Died of Injuries. 3/5/18. United Kingdom. ex France.
3/2195 Christie, Leslie Allan, Capt. Died of Disease in New Zealand. 10/11/18.
46116 Clark, Herbert, Pte. Died of Disease. 10/9/17. United Kingdom.
3/1005 Clark, William Garfield, L/Cpl. Died of Disease. 11/11/18. New Zealand.

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3/1129 Clarke, Hamilton, Pte. Killed in Action. 7/6/17. France.
3/1385 Clemens, Roy, Pte. Died of Wounds. 3/11/18. New Zealand ex France.
3/2544 Cobb, George Lynch, Pte. Died at Sea. H.S. "Marama." 27/5/17.
3/2614 Cochran, Allan Carswell, Pte. Killed in Action. 19/6/17. France.
3/2835 Collinson, William Henry, Pte. Killed in Action. 12/10/17. France.
3/2615 Cook, Ernest Claud., Pte. Killed in Action. 18/1/18. France.
3/392 Cox, James, Pte. Killed in Action. 17/9/16. France.
3/938 Crosbie, George, Pte. Killed in Action. 31/5/16. France.
3/240 Crum, Fred Albert, Tpr. Died of Wounds. 9/5/17. Mounted Field Ambulance.
11422 Cunningham, William Joseph, Pte. Killed in Action. 12/10/17. France.
3/663 Davidson, Logan Leonard, Pte. Killed in Action. 12/10/17. France.
3/492 Davies, Arthur James, Pte. Died of Disease. 17/9/15. Mudros.
3/2750 Dempsey, William James, Pte. Died of Wounds. 28/11/17. France.
3/195 Denniston, Thomas Hillier, Sgt. Died of Disease. 28/7/15. Malta ex Gallipoli.
3/2723 Devaney, Thomas Michael, Pte. Killed in Action. 12/10/17. France
3/2631 Donohue, Laurence Patrick, Pte. Died of Wounds. 20/10/17. France.
3/667 Duncan, William Munro, Lieut. Died of Disease. 15/7/18. United Kingdom.
3/127 Dyson, Richard Herbert, Sgt. Died of Disease. 5/8/15. Egypt.
3/891 Elliott, William, Pte. Killed in Action. 12/10/17. France.
3/2767 Farland, Norman, Pte. Died of Disease in New Zealand. 25/11/18
3/398 Fisher, John William, Pte. Died of Disease at Sea en route to New Zealand. 3/5/16.
3/3044 Fraser, Alexander, Pte. Died of Wounds. 14/10/17. France.
3/2879 Frei, John, Pte. Died of Wounds. 16/10/17. France.
3/894 Fricker, Bassell Saxe, Pte. Drowned. 23/10/15. Salonika.*
3/844 Garmson, John William, Pte. Died of Disease. 2/10/15. Egypt.
3/203 Gilchrist, Jack, L/Cpl. Died of Disease. 25/10/14. At Sea.
10/3886 Gilmour, William, Cpl. Died of Disease. 7/4/19. United Kingdom.
3/117a Goodrich, Gordon, C.Q.M.S. Died of Disease. 10/11/18. New Zealand.
3/498 Goddard, Douglas, L/Cpl. Killed in Action. 26/11/16. France.
3/106 Gorton, Thomas Joseph, Pte. Died of Wounds. 15/10/17. France.
3/1270 Gosnell, John, Pte. Killed in Action. 29/5/16. France.
3/1512 Grills, Frank Alfred, Pte. Killed in Action. 25/8/18. France.
3/1735 Guthrie, Thomas Errol, Capt. Killed in Action. 3/7/16. France.
3/128a Haddock, William, Pte. Killed in Action. 9/8/15. Gallipoli. Mountetd Field Ambulance.
3/2813 Hall, Horatio, Pte. Died of Wounds. 22/10/17. France.
74181 Hanlon, George Norman, Pte. Killed in Action. 6/10/18. France.
3/3071 Harris, Roy, Capt. Killed in Action. 5/4/18. France.
3/939 Harvey, David, Pte. Killed in Action. 12/10/17. France.
3/2009 Hawkins, Benjamin George, Pte. Killed in Action. 25/8/18. France
3/3102 Haworth, Ashley Aston, Lieut. Killed in Action. 1/2/18. France.
3/170 Heaver, William, Pte. Killed in Action. 3/5/15. Gallipoli.
3/638 Herdman, Robert Bruce, Pte. Drowned. 23/10/15 Salonika.*
3/1242 Hitchcock, Frank Norman Spurrell, Capt. Killed in Action. 21/10/16. France.
3/897 Hoare, Stanley Hubert, Pte. Died of Wounds. 12/8/17. France.
3/2753 Hodgson, Douglas, Pte. Accidentally killed. 21/5/19.
3/3972 Home, Leonard Arthur, Pte. Died of Disease. 9/7/18. United Kingdom.
3/3046 Hooper, George Septimus, Pte. Died of Wounds. 24/3/18. France.
3/1774 Hopkins, Leslie Garey, Pte. Killed in Action. 12/10/17. France.
3/1446 Horner, Raymond, Pte. Died of Disease. 19/5/16. New Zealand.
3/690 Huffam, Valentine Julius Blake, Pte. Died of Disease. 22/1/9. Germany.

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3/416 Ibbotson, Richard, Pte. Died of Wounds. 17/11/15. United Kingdom ex Gallipoli.
3/2148 Ingle, William John, Pte. Died of Wounds. 28/7/18. France.
3/1043 Innes, William George, Pte. Killed in Action. 12/8/17. France.
3/2880 Jamison, John, Pte. Died of Wounds. 14/10/17. France.
3/1113 Johns, Frederick Noel, Major, M.C. Killed in Action. 25/8/18. France .
3/1168 Johnston, Robert Norries, L/Cpl. Died of Wounds. 6/4/18. France
3/1047 Jones, Charles Roger, Pte. Killed in Action. 22/9/16. France.
6/1892 Joynt, William John, Pte. Died of Wounds. 14/10/17. France.
3/3027 Kerr, Alexander, Pte. Killed in Action. 12/10/17. France.
3/3410 Kirby, John Patrick, Pte. Died of Disease. 23/11/18. New Zealand
3/595 Kirk, Thomas Hugh, Pte. Drowned. 23/10/15. Salonika.*
3/421 Lawson, Joseph Johnstone, Cpl. Died of Wounds. 4/8/17. France
3/103a Lewis, Harold Johns, Pte. Died of Disease at Sea. 20/11/14.
3/3462 List, John George, Pte. Died of Wounds. 8/12/17. France.
3/1336 Little, Neil Donald, Cpl. Died of Disease. 25/11/18. New Zealand
3/1852 Lloyd, Alexander Gordon, Sgt. Died of Disease. 30/11/18. New Zealand.
3/602 McCaw, William Armstrong, Pte. Killed in Action. 12/10/17. France.
3/3507 McCombie, Robert Hercules Bridesake, Pte. Died of Wounds. 9/11/18. France.
3/427 McCutcheon, Harry, Pte. Accidental. 10/11/16. United Kingdom.
3/605 McGee, James Michael, Pte. Drowned. 23/10/15. Salonika*
3/1811 MacKenzie, Charles Duncan, W.O.I. Drowned. 9/12/16. Albany, Australia.
3/167a McNatty, Walter Ernest, Sgt. Died of Wounds. 13/10/17. France.
3/175 Mackley, George, Sgt. Died of Wounds. 17/10/17. France.
3/2782 Maher, James Jerim, Pte. Died of Disease. 26/11/18. New Zealand.
3/213 Malcolm, Alexander, Pte. Died of Disease. 29/8/15. At sea ex Gallipoli.
3/3464 Marshall, Leslie Richard Kemp, Pte. Killed in Action. 30/8/18. France.
3/1737 Martin, Arthur Anderson, Major. Died of Wounds. 17/9/16. France.
3/1247 Maurice, Leonard Peter, Pte. Killed in Action. 15/9/16. France.
3/2625 Mills, Frederick Charles, Pte. Died of Wounds. 17/10/17. France.
3/2582 Monk, Frank Lyle, Pte. Killed in Action. 12/10/17. France.
3/140a Morgan, William Alfred Reginald, Cpl. Killed in Action. 12/10/17. France.
3/1066 Morton, John, Pte. Died of Wounds. 15/9/16. France.
3/907 Moyle, Albert Robert, Cpl. Died of Wounds. 16/9/16. France.
3/2739 Murray, Albert Reynold, Pte. Died of Wounds. 9/5/18. France.
3/274 Napier, Reginald William, Pte. Accidental. 7/10/17. France.
3/913 Nicholson, Claude Harold, Pte. Died of Wounds received on s.s. "Marquette" 29/10/15. At Sea ex Salonika.
3/2029 Osborn, Travis Anderson, Pte. Died of Wounds. 17/9/16. France.
3/219 Paterson, Hugh, Pte. Killed in Action. 7/6/15. Gallipoli.
3/4277 Paterson, William Fergus, Capt. Died of Disease. 14/11/18. United Kingdom.
11/120 Patton, Andrew Cunningham, Acting-Cpl. Killed in Action. 5/5/17. France.
3/829 Peat, John Trevor, Sgt. Died of Disease. 17/11/18. Palestine. Mounted Field Ambulance.
3/1075 Penlington, Frank William, Pte. Died of Wounds. 15/9/16. France.
3/916 Perrin, Clarence Pte. Drowned. 23/10/15. Salonika.*
3/140 Perry, Arthur Theodore, Pte. Died of Wounds. 22/5/15. Gallipoli.
3/554 Pickering, William Campbell, Pte. Drowned. 23/10/15. Salonika.*
3/59 Pole, Roland Alfred, Pte. Drowned. 23/10/15. Salonika.*

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3/714 Poore, Leonard Smeaton, Pte. Killed in Action. 25/8/18. France.
3/4361 Porritt, Arnaud Leslie, Pte. Died of Disease. 4/3/19. United Kingdom.
3/507 Porter, Walter Charles, Cpl. Died of Wounds. 14/10/17. France.
3/614 Pratt, Alfred Mason, Cpl. Drowned. 23/10/15. Salonika.*
3/859 Quinn, Charles Henry, WO. II. Accidental. 11/5/17. New Zealand.
18080 Ramsay, Harold Vivian, Pte. Killed in Action. 2/4/18. France.
24/1466 Rattenbury, Charles Sampson, Pte. Killed in Action. 20/9/16.
3/2804 Read, Thomas, Pte. Killed in Action. 25/8/18. France.
3/1721 Readhead, John, Pte. Killed in Action. 22/9/16. France.
3/1083 Reeves, John Herbert, Pte. Killed in Action. 12/8/17. France.
3/621 Remmett, Alfred Howard, Sgt. Drowned. 23/10/15. Salonika.*
3/622 Rhodes, Charles Victor, Pte. Drowned. 23/10/15. Salonika.*
3/1419 Rice, Josiah Henry. Pte. Died of Wounds. 16/10/17. France.
3/623 Richards, Peter Gilbert, Pte. Drowned. 23/10/15. Salonika.*
3/3031 Riddell, David, Pte. Killed in Action. 12/9/18. France.
3/964 Robinson, Harry, Pte. Killed in Action. 23/9/16. France.
3/624 Robinson, William Balmer, Pte. Drowned. 23/10/15. Salonika.*
3/802 Rochfort, Walker, Pte. Died of Wounds. 18/6/17. France.
3/921 Rogerson, Walter Burnett, Pte. Killed in Action. 17/9/16. France
3/626 Ross, John Turnbull, Pte. Drowned. 23/10/15. Salonika.*
3/719 Savage, Thomas Copeland, Major. Died of Disease. 13/8/15. Egypt.
3/2874 Serpell, Samuel Llewellyn, Capt., M.C. Killed in Action. 15/12/17. France.
3/2496 Shand, Alexander, Pte. Killed in Action. 12/10/17. France.
3/1190 Sharman, Ernest Walter, Pte. Killed in Acton. 18/1/18. France.
6/1710 Shaw, George Irvine, Pte. Killed in Action. 19/10/17. France.
3/106a Shrimpton, Hugh Robert, Pte. Died of Disease. 29/9/15. Malta ex Gallipoli.
3/446 Sinclair, William Smith, Major. Died of Disease at Sea. 25/1/19.
3/95 Singleton, Wilfred, Lance/Cpl., D.C.M. Died of Wounds at Sea ex Gallipoli. 26/6/15.
23/281 Skivington, Edward, Pte. Died of Wounds. 28/5/17. France.
3/3018 Slade, George Alfred, Pte. Died of Disease. 6/1/19. United Kingdom ex France.
3/225 Sloan, William James, Pte. Died of Wounds. 6/10/16. United Kingdom ex Gallipoli.
3/927 Smart, William, Pte. Drowned. 23/10/15. Salonika.*
3/2584 Stainton, Frank Harold Bates, Pte. Died of Wounds. 24/6/17. France.
11/587 Stevenson, Bertram Onslow, Pte. Died of Disease. 24/7/18. United Kingdom.
3/819 Stevenson, Lindsay, Sgt. Died of Disease in New Zealand ex Marama 20/12/17.
15094 Stewart, James, Pte. Died of Wounds. 19/10/17. France.
3/1552 Struthers, James, Reid, Pte. Killed in Action. 12/10/17. France.
13/239 Taylor, James, Pte. Died of Wounds. 22/5/17. United Kingdom ex France.
3/118a Thomas, Charles Ernest, Lieut.-Col. Killed in Action. 28/8/15. Gallipoli.
3/38 Thompson, Clarence Dornford, Pte. Drowned. 23/10/15. Salonika.*
3/453 Thomson, John Henry, Cpl. Died of Disease. 5/4/18. France.
34/301 Thorn, Ben, Pte. Killed in Action. 20/11/17. France.
3/746 Tolhurst, Alexander Molesworth, Capt. Killed in Action. 8/5/18. France.
3/2629 Vaile, W. R., Mounted Field Ambulance. Accidentally drowned. 10/7/17. Palestine.
3/1272 Venables, Joseph Kenderick, Capt., M.C. Died of Wounds. 9/5/18. France.
3/39 Walter, John Bruno, Pte. Drowned. 23/10/15. Salonika.*

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3/740 Wards, James, Pte. Drowned at Sea ex Gallipoli. 2/9/15.
70090 Warmington, Ernest James, Pte. Killed in Action. 23/10/18. France.
3/114a Warwood, Charles Alfred, Sgt. Died of Disease. 2/10/15. Mudros.
10/1021 Webb, Ernest John Herbert, Lieut. Died of Injuries. 17/11/14. Colombo en route to Egypt.
3/1800 Webb, Lewis Henry Barnes, Pte. Died of Wounds. 19/6/17. France
75618 Westerby, William James, Pte. Died of Disease. 30/8/18. United Kingdom.
3/1258 Wheeler, William Arthur, Capt. Died of Misadventure. Overdose of morphia. 16/2/18. New Zealand.
3/2828 Wilkinson, Albert Victor, Pte. Died of Wounds. 20/10/17. France.
3/297 Wolner, Clifton Roy, C.Q.M.S. Died of Disease. 8/11/18. New Zealand.
9/894 Wood, David, Pte. Died of Disease. 16/1/19. France.
3/2053 Wood, George Huntly, Capt. Died of Wounds. 11/8/16. Mounted Field Ambulance.
3/2196 Wood, Oscar John, Ptet. Died of Wounds. 4/10/17. France.
3/154 Arthur-Worsop, Francis Henry, Pte. Killed in Action. 9/5/18. France.
3/735 Wotton, William Burnard, Pte. Killed in Action. 22/9/16. France.
3/105 Wrathall, William Henry, Pte. Died of Disease. 13/9/15. United Kingdom ex Gallipoli.
3/1458 Wright, George Bertram, Pte. Killed in Action. 1/10/16. France.

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III. N.Z.M.C. Honours and Awards.

C.B.

Begg, C. M., Colonel, C.M.G.

C.M.G.

Acland, H. T., Lt.-Col. C.B.E.
Barnett, L. E., Lieut.-Col.
Begg, C. M., Col. C.B. (F).
Collins, W. E., Col. (the Hon.) M.L.C.
Fenwick, P. C., Lieut.-Col.
McGavin, Major-General, Sir D. J. D.S.O.
Mill, T., Lieut.-Col.
Murray, D. N. W., Lieut.-Col. D.S.O.
Myers, B. E., Lieut.-Col.
O'Neill, E. J., Colonel, D.S.O.
Parkes, William Henry, Col. C.B.E.
Tewsley, C. H., Lieut.-Col.
Wylie, D. S., Colonel. C.B.E.

C.B.E.

Ackland, H. T. D., Lieut.-Col. C.M.G.
Carbery, A. R. D., Lieut.-Col.
Hercus, C. E., Major. D.S.O.
Home, G., Lieut.-Col.
Tracey-Inglis, R., Col.
MacDonald, W. M., Lieut.-Col.
McKibbin, T., Major.
McLean, H. J., Lieut.-Col.
Mill, T., Col.
Parkes, W. H., Col. C.M.G.
Walton, R. H., Lieut.-Col.
Wylie, D. S., Col. C.M.G.

D.S.O.

Ardagh, P. A., Capt. M.C.
Cameron, F. G., Major.
Craig, G., Lieut.-Col.
Finn, B. S., Capt.
Hercus, C. E., Major. C.B.E.
Jory, P. J., Major (tem. Lieut-Col.).
McCormick, K., Major.
McGavin, D. J., Colonel, C.M.G.
Murray, D. N. W., Lieut.-Col. C.M.G.
Newton, C. T. H., Lieut.-Col.
Neil, J. H., Lieut.-Col.
O'Neill, E. J., Col. C.M.G.
Richards, J. F. G., Capt.
Stout, T. D. M., Major.
Widdowson, E. A., Major.

M.C.

Abbott, W. N., Capt.
Addison, A. S., Capt.
Aitken, W., Major.
Ardagh, P. A., Capt. D.S.O.
Baxter, R. H., Lieut.
Benham, P. B., Capt.
Borrie, W. G., Capt.
Brewster, R. C., Capt.
Connor, J., Capt.
Crawford, J. G., Capt.
Dempster, N. H., Capt.
Goldstein, H. M., Capt.
Gordon, K. F., Capt.
Gow, J. G., Capt.
Guthrie, R. N., Capt.
Johns, F. N., Capt.
Kemp, F. W., Capt.
Lumsden, F. W., Capt.
McGhie, J., Capt.
Marks, J. D., Capt.
Nelson, A. D., Capt.
Orbell, R. G. S., Capt.
Prior, H., Capt.
Sandham, Geo., Hon. Capt.
Serpell, S. L., Capt.
Short, A. V., Capt.
Venables,, J. K., Capt.
Wyllie, E. M., Capt.

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O.B.E.

Baigent, C. V., Major.
Bernau, H. F., Lieut.-Col.
Bowerbank, F. T., Major.
Brewis, A. S., Major.
Brown, J. F., Capt.
Bruce, W. B., Major.
Buchanan, H. M., Major.
Colbeck, E. H., Major.
Fenwick, G. E. O., Major.
Fenwick, D. E., Capt. (temp. Major).
Hogg, R. H., Major.
Home, G., Major.
Izard, A. W., Major.
McKibbin, T., Major.
Marchant, E. L., Major.
Pickerill, H. P., Major.
Short, H., Major.
Stout, T. D. M., Major.
Tapper, K. E., Capt.

M.B.E.

Staples-Brown, R. C., Qr.M. and Capt.
Chisholm, P., Capt.
Dalston, N. H. M., Capt.
Hay, S., Capt.
Hosking, A., Major.
Isaacs, D. N., Capt.
Jack, W., Lieut.
Lowe, E. C., Capt.
Tait, H. C., Capt.
Tweedy, W. G., Capt.

D.C.M.

3/115	Beauchamp, H. R. H., C.S.M.	3/1184	Parsons, T. W., Pte. M.M. and Bar.
3/317	Cardno, J. F.	3/282	Roberts, A., S.S.M.
3/158	Comrie, J., Pte.	3/1189	Sail, H. L.
2/168	Henry, W. J., Pte.	3/95	Singleton, W. C., L/Cpl.
3/269	Moor, F. W., S.M.	3/447	Steedman, A. B., L/Cpl.
2/809	Mulligan, A. S., Lieut. M.M.	15/616	Crawford-Watson, L., Pte.
3/818	Olds, J., Pte.		

M.M.

3/966	Aitken, H. D., Cpl.	3/2133	Corry, W. A., Pte.
3/155	Allpress, A. E., L/Cpl.	3/3072	Crawshay, V. G., Pte.
3/838a	Anderson, W. F., L/Cpl.	3/2011	Cupples, F. L., Pte.
3/836	Andrews, E. E., Pte.	3/3454	Davis, O. O., Pte.
3/384	Angus, J. N., Pte.	3/2056	Douglas, A. McF.
3/1141	Austin, A. T. W.	3/1509	Downey, S. G.
3/2015	Baillie, F. W.	3/1396	Dredge, G. M. L., Sgt.
3/160	Barber, F., Pte.	3/196	Eagle, F., Sgt.
5/747	Barker, W. W.	3/1837	Edwards, S. H., Pte.
3/649	Beckingham, J. E. W., L/Cpl.	3/1745	Evans, R. S., Sgt.
3/1144	Begg, I. W. D., Pte.	3/820	Falla, H. T., Pte.
3/233	Biggar, T., Pte.	3/1699	Farnsworth, E. E., Cpl.
3/1747	Black, M. C., Sgt.	3/895	Gray, R. N., L/Sgt.
3/3549	Boyd, E. F.	3/107	Green, F. V., Cpl.
3/1686	Bradshaw, J. W., Pte.	3/3494	Green, G. T. W.
3/2375	Bruce, F., Pte.	3/251	Greenwood, J., Sgt.
3/164	Campbell, F., Sgt.	3/255	Hartman, B., Pte.
3/1008	Cantor, W., Pte.	3/410	Hawke, A. R.
3/85	Carruthers, W., Pte. and Bar.	3/2814	Heckin, T., Pte.
3/4238	Carson, J.	3/258	Henderson, R. A., Pte.
3/1383	Carver, S. F., Pte.	3/1738	Heron, D. H. H., C.Q.M.S.
3/302	Church, R. A., Pte.	5/943	Holmes, O. S., Pte.
11/1301	Clague, J., L/Cpl.	3/1774	Hopkins, L. G.
3/886	Clemance, C. W., Pte.	3/89	Horwell, W. W., L/Cpl.
3/1385	Clemens, R.	3/2700	Ingram, S., Pte.
3/996	Clothier, W. A., Sgt.	3/2011	Jackson, H., Pte.
3/96	Cooke, W. R., Cpl. and Bar.		

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3/2929 Johnson, J. A. W., Pte.
3/1790 Johnstone, A. M., S/Sgt.
3/2125 Jones, D. G., Pte.
3/180 Keesing, H. W., Sgt.
3/127 Kidman, C. H., Sgt. and Bar.
3/1171 Kyle, L. A., Pte.
3/3827 Lane, W. G., Pte .
3/2755 Lark, A. J., Pte.
3/1231 Saunders-Loder, W., Pte.
3/696 London, R. P., Sgt.
9/856 McAusland, J. Cpl.
12/2407 McBreen, E., Pte.
24/851 McCarthy, J., Pte.
17/339 McConnell, T. D., Cpl.
3/911 McKenzie, J. W., Cpl.
3/1062 McLenan, A. D., Q.M.S. Bar to M.M.
3/94 McLeod, D. S., Sgt.
11/732 Manson, W., Cpl.
3/1781 Metge, D. D., Pte.
3/267 Milligan, P. G., Sgt.
3/1411 Moore, F. D., Pte.
2/809 Mulligan, A. S., Sgt. D.C.M.
3/1783 Myers, G., Pte.
24/1149 Newton, A. W. H., Pte.
9/569 O'Callaghan, J. W., Cpl.
3/1665 O'Connell, T., Pte.
3/2493 Paine, E. I., Pte.
3/1184 Parsons, T. W., Pte. D.C.M.
3/1184 Parsons, T. W. Bar to M.M.
3/1788 Pearson, R. M., Pte.
3/165 Perry, W. J., Sgt.
3/278 Philson, G. H., L/Cpl.
11/734 Pointon, A. E., L/Cpl.
8/454 Powers, A. T., Pte.
3/146 Purdie, C. L., Pte. M.S.M.
3/1547 Radcliffe, D. S., Pte.
3/380 Ralston, W., Pte.
23/266 Ricketts, J. E., Pte.
3/282 Roberts, A., C.G.M.S. D.C.M.
3/1792 Rutherford, K. McK., Pte.
6/3857 Ryan, D.
3/1722 Sharpe, F. J.
6/3466 Slade, H. R., Pte.
3/1556 Smith, W. H., Pte.
3/1718 Pye-Smith, P. R., Pte.
3/3080 Smith, W., Pte.
3/1555 Smyth, J. F., Pte.
3/1196 Stainton, W. G.
3/1197 Stapley, R. H., L/Cpl.
8/1845 Stewart, A., Pte.
8/3079 Stewart, A. D., Pte.
3/510 Stunell, C. E., L/Cpl.
12/2487 Tchernegovski, W. I., Pte.
23/301 Thorn, B., Pte.
8/2487 Toy, W.
3/3614 Tyson, J. H.
3/1205 Veitch, C. G. C., Pte.
3/456 Vincent, R. W., Cpl.
3/2044 Voller, R. E., Pte.
3/3645 Voss, H., Pte.
5/457 Wakeling, W.
3/40 Whalley, G., Cpl. and Bar.
3/229 Wilson, A., Pte.
3/295 Wilson, R., L/Cpl.
25978 Wilson, S., Pte.

M.S.M.

3/321 Eaton, H. F., Sgt.
3/576 Ferguson, R. A., S/Sgt.
3/123 Foster, F. W., S/Sgt.
3/846 Foster, W. A., S.S.M.
3/408 Hallett, F. J. P., L/Cpl.
3/257 Hawes, G. H.
3/2249 Hindmarsh, H. L., Q.M.S.
3/2619 Hume, C. J., Pte.
3/125 Kerr, R. A., S.S.M.
10/1551 Lakeman, A., Sgt.
3/609 McLaren, P. C., W.O. 1.
3/145 Norrie, E. R., S.S.M.
3/1076 Parkinson, W. H., Q.M.S.
3/1072 Parsons, T. C., Sgt.
3/615 Prentice, A., S/Sgt.
3/146 Purdie, C. L., S.S.M.
3/142 Robinson, G. R., S/Sgt.
4/51 Rountree, E. G., S.S.M.
3/720 Selater, J. R., S/Sgt.
3/3035 Sherrard, T. J., S/Sgt.
3/2748 Sleight, G. H. B., Sgt.

OTHER DECORATIONS

Begg, C. M., Col. French Croix de Guerre with star
3/144 East, A. F. D., Pte. Serbian Gold Medal.
3/549 Hunter, E. McG., Pte. Belgian Croix de Guerre.
3/210 Jackson, J. G., Sgt. Belgian Croix de Guerre.
3/172 Loftus, F., Sgt. Belgian Croix de Guerre.
3/424 Miller, G. L., Sgt. Belgian Croix de Guerre.
3/1307 Neil, J. H., Lieut.-Col. Belgian Croix de Guerre.
3/712 Parkes, W. H., Col. Order of the Hospital of St. John of Jerusalem in England. Knight of Grace.
12/3776 Patterson, S. J., Pte. Italian Bronze Medal.

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MENTIONED IN DESPATCHES

16801 Abbott, H., Pte.
Anderson, L. J., Pte.
Ardagh, P. A., Capt. D.S.O., M.C.
3/115a Beauchamp, H. R., 1st C.W.O. D.C.M.
Begg, C. M., Col. C.B., C.M.G. (F).
3/233 Biggar, T., L/Cpl.
Biss, J. A., Pte.
3/2019 Black, J. L., Sgt.
Bogle, G. V., Capt.
3/1317 Borrie, W. G., Capt.
Bowerbank, F. T., Major.
Buchanan, H. M., Major.
10/1127 Buckles, W., Sgt.
10/2539 Cachemaille, E. D., S/Sgt.
3/648a Cameron, F. G., Major.
Carbery, A. R. D., Major.
3/317 Cardno, J. F., Pte.
Childs, T. W. J., Capt.
3/1154 Comer, J. F., Cpl. (temp. Sgt.)
3/158 Comrie, J., Pte.
3/12 Copeland, R., S.M.
12/360 Craig, G., Lieut.-Col.
Dawson, C. McB., Capt.
3/1765 Dick, E. V., Sgt.
3/2056 Douglas, A. McF., Pte.
3/667 Duncan, W. M., S.M.
3/1767 Dye, P., Pte.
3/144 East, A. F. D., Pte.
Fenwick, P. C., Lieut.-Col.
Finlayson, E. M., Capt.
Finn, B. S., Capt.
Fisher, F. V., Sgt.
Goldstein, H. M., Capt.
3/251 Greenwood, J., Pte.
Guthrie, R. N., Capt.
3/256 Hartmann, F. W., Sgt.
3/257 Hawes, G. H., S/Sgt.
3/410 Hawke, A. R., Cpl. (tem. Sgt.)
3/170 Heaver, W., Pte.
3/1042 Hendry, C. A., Cpl.
3/168 Henry, W. J., Pte.
Hereus, C. E., Major. M.D.
Hereus, C. E., Capt. (temp. Major).
Horsburgh, P. G., Capt.
Jack, D., Pte.
3/2531 Johnston, G., Pte.
Jones, H. A., Sgt.
Jory, P. J., Major (tem. Lieut-Col.).
3/180 Keesing, H. W., Pte.
3/125a Kerr, R. A., Q.M.S.
30818 Lonergan, S., Pte.
McCormick, K., Major.
McCormick, K., Capt.
McGavin, D. J., Lieut.-Col. (temp. Col.).
McGavin, D. J., Lieut.-Col.
McGavin, D. J., Col.
McLean, H. J., Lieut.-Col.
3/704 Maguire, C. E., Major.
3/550 Manttan, H. B., S/Sgt.
Marchant, E. L., Major.
Martin, A. A., Major.
3/153a Mitchell, J., Capt.
3/269 Moor, F. W., W.O.
3/269 Moor, F. W., S./M.
3/709 Munro, P., Pte.
Murray, D. N. W., Lieut.-Col.
3/1307 Hardie-Neil, J., Lieut.-Col.
3/1307 Neil, J. H., Lieut.-Col.
3/1070 Newman, J. F., Pte.
Newton, C. T. H., Lieut.-Col.
O'Neill, E. J., Lieut.-Col.
O'Neill, E. J., Major.
Orbell, R. G. S., Capt.
Pearless, W. R. V. D., Lieut.-Col.
3/829 Peat, J. T.,
11111 Perry, T.
3/2158 Rushbrooke, W. H., Pte.
Short, A. V., Capt.
Simcox, J. E. L., Capt.
Singleton, W., L/Cpl.
3/2748 Sleight, G. H. B., C.S.M.
3/1192 Smith, S. T., Pte.
Spedding, I. N., Capt.
3/447 Steedman, A. B., L/Cpl.
Stout, T. D. M., Major.
802 Sullivan, A. M., Cpl.
3/299 Walton, Robert Henry, Lieut-Col.
3/299 Walton, R. H., Major.
15/606 Crawford-Watson, L., Pte.
Widdowson, E. A., Major.
3/95a Williams, W. A., S/Sgt.
Withers, R. L., Capt.
Wood, G. H., Capt.
Wright, T., Pte.

BROUGHT TO THE NOTICE OF THE SECRETARY OF STATE FOR WAR

Acland, H. T. D., Major (temp. Lieut.-Col.).
Aickin, C. G., Capt.
Allen, S., Capt.
3/647 Baker, G. R., Sgt.
Barnett, L. E., Major (temp. Lieut.-Col.).
Bernau, H. F., Major.
Bowerbank, F. T., Major.
3/2001 Brewis, A. S., Major.
3/881a Bruce, W. B., Capt. (temp. Major).
3/390 Chisholm, C. A., Pte. (T. Cpl.)
3/744 Collins, W. E., Col. Hon.
Dalston, N. H. M., Capt.
3/1416 Dobie, J. D., Pte.

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Brought to the notice of the Secretary of State for War.—*continued.*

Drake, E. A., Sgt.
3/667 Duncan, W. M., Sgt. Mjr.
3/2917 Fenwick, D. E., Capt.
Fenwick, G. E. O. Capt.
Fenwick, P. C., Colonel
Fergus, T., Major.
3/180a Flintoff, R. W.
3/846 Foster, W. A., S.S.M.
10225 Foxwell, W. F., Pte.
3/79 Gillett, J. B., Pte.
3/674 Gray, H. P., Sgt.
3/1518 Heath, A. H., Pte.
3/686 Henderson, H., Q.M.S.
Hogg, R. H., Capt. (T/Mjr.).
Hosking, A., Major.
3/72 Isaacs, D. N., Capt.
3/693 Jones, H. A., S.S.M.
Julian, T., Capt.
12/2363 Laughton, F., Cpl. (T. S/Sgt.).
Lowe, E. C., Capt.
3/697 Lowry, L. G., S/M.
McCaw, A. T., Capt.
Macdonald, W. M., Major (temp. Lieut.-Col.).
3/850 McKibbin, T., Major.
3/609 McLaren, P. C., S/Sgt.
3/90 McNiven, W. A., Sgt.
12/965 Melville, C. B., S/Sgt.
Mill, T., Lieut.-Col.
3/1430 Millea, F. P., Pte.
3/58 Mirfin, M., S/Sgt.
Myers, B., Lieut.-Col.
3/711 Otway, A. R., Sgt.
4/1572 Naughton, M. J., L/Cpl. (tem. Sgt.).
Orchard, A. J., Capt.
3/712 Parkes, W. H., Col.
3/2961 Pickerill, H. P., Major.
Ritchie, T. R., Major.
3/1475a Roberts, H., S.S.M.
4/51a Rountree, E. G., Q.M.S. (tem. S.S.M.).
3/2444 Sell, F. H., T/Sgt.
3/3035 Sherrard, T. J., T/Cpl.
Short, H., Capt.
Simpson, J. C., Major.
Simpson, W. H., Capt.
3/105a Smith, J. G., T/Sgt.).
3/1198 Stephens, J., Pte.
Tewsley, C. H., Lieut.-Col.
Tovey, A. H., Capt.
3/454 Tomes, S., Pte.
3/725 Tweedy, Wm. G., Capt.
Unwin, W. H., Capt. (T/Mjr.)
3/291 Wade, P. T., Pte. (T/Sgt.).
Wallis, W. S., Capt.
3/2501 Wright, A. M., S.S.M.
Wylie, D. S., Major (temp Lieut.-Col.).

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IV. Nominal Roll of Wounded in N.Z.M.C.

71702 Abernethy, N. C., Pte. 2/11/18
3/1379 Allan, M., Pte. 12/10/17.
70027 Anderson, P. J., Pte. 23/10/18
3/1140 Anderson, T., Pte. 3/8/17.
3/968 Andrews, E. W., Pte. 25/5/18
3/163a Andrus, H., Pte. 8/8/15. Gallipoli.
3/384 Angus, J. H., Cpl. M.M. 13/9/18.
3/2859 Ardagh, P. A., Capt. D.S.O. M.C. 3rd occasion. 7/7/18
3/3482 Austiss, G. O., Pte. 5/12/17
3/3535 Auton, R., Pte. 5/4/18.
3/2610 Avery, W. L., Pte. Date unknown.
3/3726 Baddiley, J. W., Pte. 27/10/18
3/3144 Baeyertz, R., Pte. Date unknown.
3/314 Baigent, C. V., Major. O.B.E. 9/8/15. Gallipoli.
3/3022 Baigent, L. C., Pte. 4/11/18.
3/1922 Bailey, A. G., Pte. 23/9/16.
3/828 Baillie, J. R., Pte. 29/1/18.
3/1257 Bain, J. B., Pte. 30/9/17.
3/2016 Baker, R. A., Pte. Date unknown.
3/2051 Banks, B. W., Pte. 24/8/18.
3/3856 Barke, A., Pte. 12/10/18.
3/1380 Barlow, W., Pte. Date unknown.
3/2594 Baxter, R. H., Capt. M.C. 29/3/18.
3/232 Bayliss, H. S., Pte. 22/9/15. Gallipoli.
3/1142 Barrett, J. C., Pte. Date unknown.
3/649 Beckingham, J. E. W., L/Cpl. M.M. 12/10/17.
3/1143 Beauchamp, M. F. W. G., Pte. 22/5/16.
3/206 Begg, A. T., Pte. 29/4/15. Gallipoli.
3/303 Begg, C. M., Col. 27/6/15. Gallipoli.
3/1144 Begg, J. W. D., Pte. M.M. 6/9/18.
3/837 Bell, P. H., Pte. 21/11/15. Gallipoli.
3/2926 Berry, J. A., Lieut. 25/6/17.
3/1755 Besley, S. V., Pte. 16/9/16.
3/2088 Bestall, L. D., Pte. 22/10/17.
3/2152 Benzie, S. J., Pte. Date unknown.
3/837 Bell, P. H., Pte. 13/10/17.
3/111a Bennett, A. C., Cpl. 7/8/15. Gallipoli.
3/2453 Bewick, A. D., Pte. Date unknown.
3/880 Black, A. A., Pte. 20/9/16.
3/3023 Black, A. E., Pte. Date unknown.
8/3487 Black, H., Pte. 3/12/17.
24/691 Blackburn, H. C., Pte. 27/5/17
3/982 Bourke, C. H., S/S. 4/5/17. Canal Zone, Egypt.
3/1149 Bovard, W. H., Pte. 7/6/17.
3/3549 Boyd, E. F., Pte. M.M. 3/4/18
3/1686 Bradshaw, J. W., Pte. M.M. 5/9/18
3/132 Brawn, L. C., Pte. 14/9/15. Gallipoli.
3/1150 Bright, G. S., Pte. Date unknown.
3/3117 Brookie, P. G., Pte. 15/9/18
3/881 Brown, A. C., Cpl. 16/10/17
3/971 Brown, J. F., Capt. O.B.E. 17/9/16.
3/2871 Brueton, B., Pte. 30/1/18.
25/588 Buckland, W. T., Pte. 4/5/17.
24/1607 Burns, B. P., Pte. 27/6/17.
3/882 Burry, H. N. F., Cpl. 4/5/17. Canal Zone, Egypt.
3/3136 Butler, W. H., Pte. Date unknown.
3/3451 Byron, A. E., Pte. Date unknown.
3/1739 Caddick, A. E., Sgt. 12/8/17.
3/3024 Cairns, J. E., Pte. 13/9/18.
3/2020 Calder, W. J., Pte. 12/10/17.
3/2488 Caley, A., Pte. 2nd occasion. 4/9/18.
3/2488 Caley, A., Pte. 10/6/17.
3/2425 Campbell, W., Pte. 16/10/17.
3/864 Cameron, N. G., Pte. 11/8/15. Gallipoli.
3/162 Carney, J., Pte. 25 - 29/4/15. Gallipoli.
3/1259 Carr, E. J. W., Pte. 17/10/17.
3/2883 Carter, T. G., Pte. Date unknown.
3/162a Cates, C., Pte. 13/8/15. Gallipoli.
26246 Cavanagh, W. T., Pte. 15/10/17
3/3199 Chappell, W. J., Pte. Date unknown.
3/1691 Charles, J. L., Pte. 19/9/16.
3/1800 Chevassus, P. J. L., Pte. 29/5/16
3/2856 Childs, T W. Y., Capt. 27/7/17.
3/3800 Christie, S. F., Pte. 30/10/18.
3/2713 Clapham, L., Pte. 5/9/18.
3/3488 Clark, E. R., Pte. 5/4/18.
3/3119 Clarke, E. W., Pte. Date unknown.
3/1001 Clarkson, C. W., Pte. 22/9/16.
3/886 Clemance, C. W., Pte. M.M 21/9/16.
3/658 Clissold, F. O., Pte. 25/1/18.
3/996 Clothier, W. A., Sgt., 27/10/18
3/3553 Cole, C. H. F., Pte. 30/1/18.
3/2487 Collier, G. E., Pte. 15/10/17.
3/842 Collin, L., Pte. Date unknown
3/2160 Compton, S. G., Pte. 3/12/17.
3/3919 Conibear, O., Pte. 24/10/18.

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NOMINAL ROLL OF WOUNDED—(Continued)

3/1154 Comer, J. F., Cpl. 12/8/16. Canal Zone, Egypt.
3/2615 Cook, E. C., Pte. 22/7/17..
3/96 Cook, W. E., Cpl. M.M. and Bar. 1/10/16.
3/12 Copeland, R., S.M. 1/10/16.
3/391 Couch, A. B., Pte. 13/8/15. Gallipoli.
3/2507 Couchman, H. H., Pte. 27/11/17
3/3555 Cowan, D. A., Pte. 5/4/18.
3/3876 Crabtree, E. A., Pte. 30/10/18
12/360 Craig, G., Lieut.-Col. 5/5/15. Gallipoli.
12/360 Craig, G., Lieut.-Col. D.S.O. 10/5/15. England.
3/2218 Crawford, R. J., Pte. 5/2/18.
3/3072 Crawshay, V. G., Pte. M.M. 4/12/17.
19120 Cronin, J. M., Pte. 13/10/17.
3/241 Culpan, H. C., Cpl. 2nd occasion. 12/10/17.
3/2101 Cumberbeach, T. H. C., Pte. 19/7/17.
3/995 Cummins, A. B., Pte.
3/193 Curry, E. E., Pte. 14/6/15. Gallipoli.
3/490 Cusack, W. P., Pte. Date unknown.
24/111 Darroch, E. C. R., Pte. 5/4/18
3/843 Davidson, J., Pte. 24/11/15. Gallipoli.
3/888 Davis, A. R., Pte. 2nd occasion. 13/9/18.
3/3454 Davis, O. O., Pte. M.M. Date unknown.
3/2573 Dawson, W. C. W., Pte. 29/11/17.
6/1214 Dearsly, R. A., Capt. 19/6/16*
3/3559 Delargey, F. T., Pte. 3/5/18.
3/3560 De Lisle, E. W., Pte. 30/8/18.
6/2497 Dennis, E. A., Pte. Date unknown.
3/86 Dick, C. K., Cpl. 19/9/15. Gallipoli.
3/2458 Dick, F., Pte. 25/1/18.
3/2939 Dickison, L., Pte. 12/10/17.
3/3823 Dobbs, L., Pte. 26/10/18.
43081 Dobson, J., Pte. 13/9/18. 2nd occasion.
3/129 Dodds, A. C., Pte. 8/8/15. Gallipoli.
70258 Douglas, P. J., Pte. 30/10/18.
3/100a Drake, E. A., Pte. 12/8/15. Gallipoli.
3/1396 Dredge, C. M. L., Sgt. M.M. 4/6/17.
3/242 Drury, L. G., Pte. 25-29/4/15. Gallipoli.
16/999 Duncan, J. D. C., Capt. 15/9/16
3/1766 Dunn, J. F., Pte. 20/9/16.
3/196 Eagle, F., Sgt. M.M. 7/6/17.
3/144 East, A. F. D., Pte. 10/8/15. Gallipoli.
3/2897 Edie, E. K., Capt. 12/8/17.
11/759 Edney, O., Pte. August, 1915.
3/1160 Edwards, E. E., Pte. 19/4/17.
3/1375 Elliott, V. E., Pte. 27/7/17.
6/1523 Ellis, H., Pte.
3/1269 Ellwood, A., Pte. 5/6/16.
3/1015 Eltringham, G., Pte. 7/6/17.
3/3562 Estall, H. W., Pte. 29/1/18.
3/1745 Evans, R. C., Sgt. M.M. 26/8/18.
3/1923 Evans, W. L., Pte. 7/6/17.
3/397 Eves, J. B., Cpl. 12/8/16.
11773 Everiss, D., Pte. 25/4/18.
3/820 Falla, H., Pte. M.M. 18/6/17
3/668 Fama, G. J., Pte. 21/9/16.
3/857 Faris, J. E., Capt. 6/10/17.
3/1699 Farnsworth, E., Cpl. M.M. 4/6/17.
3/3151 Fenwick, C. C., Pte. 29/1/18.
3/30 Field, H., Sgt. 31/5/15.
3/2136 Fife, K., Pte. 30/4/18.
3/1677 Findlay, H. O., Sgt. 6/10/17.
3/305 Findlay, S. H., Pte. 28/8/15.
3/1700 Fleming, J. L., Pte. 25/8/18.
3/103 Ford, A. A., Pte. 8/6/15.
3/1018 Forrester, J. Date unknown.
3/2012 Fossette, W. E., Pte. 25/8/18.
21382 Foster, C. L., Pte. 4/6/17.
51562 Foster, E. G., Pte. 26/8/18.
3/1769 Freeth, H. J., Pte. 12/10/17.
3/2879 Frei, J., Pte. 16/8/17.
3/2549 Fyson, A. F., Pte. 25/8/18.
3/1025 Gaskell, G. O., Pte. 1/10/16.
3/2164 Gauntlett, C. G., Pte. 2nd occasion. 15/10/17.
3/3147 Geddes, J., Pte. 5/1/18.
3/322 Geden, G. V., L/Cpl. Date unknown.
6/233 Gilbert, D., Pte. 22/9/16.
28020 Gilby, G. B., Pte. 22/9/16.
3/2839 Gillespie, R. D., Pte. 12/10/17.
58679 Gilmour, D. H., Pte. 26/10/18
3/1702 Gilmour, W., Pte. 4/9/18.
3/1027 Goldsmith, E. L., Pte. 16/9/16
3/1118 Good, H. A., Capt. 14/9/16.
3/2478 Gooch, N. R., Pte. 25/1/18.
3/166 Gooder, N., L/Cpl. 15/10/17.
3/2616 Goodman, H. A., Pte. Date unknown.
3/673 Gordon, C. M., Pte. Date unknown.
3/1024 Gould, S. H., Pte. 14/10/17
3/250 Graham, J., Cpl. 9/7/15.
70140 Graham, R., Pte. 23/10/18.
3/3025 Gray, A., Pte. Date unknown.
3/3734 Grayson, F. R. W., Pte. 4/11/18.
3/107 Green, F. V., Cpl. M.M. 27/3/18

N.Z.D.C. attached.

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NOMINAL ROLL OF WOUNDED—(Continued)

3/3949 Green, G. T. W., Pte. M.M. 19/12/17.
3/675 Green, L. W., Cpl. 12/10/17.
3/2677 Greer, W. L., Pte. 15/10/17.
3/1021 Griffiths, G., Pte. 15/10/17.
3/546 Gunning, H., Pte. 5/8/15. Gallipoli.
7/637 Guthrie, N. R., Lt.-Col. M.C. 2nd occasion. 21/8/15.
3/2751 Guyton, P. J., Pte. 12/10/17.
3/1163 Hair, J. B., Pte. 5/12/17.
3/679 Hall, G. W. 19/2/18.
3/3495 Hancock, T. E. H., Pte. 8/12/17
3/680 Hantler, H. J., Pte. 5/4/18.
34371 Hardie, J. H., Pte. 13/9/18.
3/3045 Hare, H. B., 25/8/18.
3/1031 Harrison, R., Pte. Date unknown.
49899 Harvie, A. H., Pte. 5/9/18.
3/1028 Haslett, J. S., Pte. 10/8/17.
3/878 Hay, A. G., Pte. 12/10/17.
3/3143 Haydon, V., Pte. 25/8/18.
3/1032 Hayes, S. M., Pte. 1/10/16.
3/221 Haywood, W., Pte. 25/7/17.
3/685 Hazelwood, T. O., Pte. Date unknown.
8/1749 Healey, T. J., Pte. 5/4/18.
3/115 Heald, C. H., Pte. 16/8/15.
3/1771 Hebden, W. J., Pte. 16/9/16.
3/166a Hegan, L., Q.M.S., 12/8/16. Canal Zone, Egypt.
3/258 Henderson, R. A., Cpl. M.M. 12/10/17.
3/3703 Henderson, W., Pte. 2/10/18.
3/1706 Heppleston, G., Pte. 2nd occasion. 12/9/16.
3/3633 Hickmott, G. W. E., Pte.
3/1521 Hill, J. L., Pte. Date unknown
12186 Hilton, T., Pte. Date unknown
3/896 Hoare, A. E., Sgt. 20/9/16.
3/412 Hoare, G. H., L/Cpl. 2nd occasion. 30/9/18.
24/1567 Hogue, R. J. Date unknown.
3/2684 Honore, E. N., Pte.
3/3128 Hook, R., Pte. 4/10/17.
3/2087 Hooper, O. R., Pte. 19/9/16.
3/1746 Hounsell, W. K., L/Cpl. 2nd occasion. 27/5/17.
3/3148 Howes, A. J., Pte. 5/1/18.
3/2209 Hughes, J. G., Pte. 18/10/17. 2nd occasion.
3/1030 Hume, A. L., Pte. 17/9/16.
3/2686 Hunt, G. R., Pte. 7/6/17.
3/1707 Hutton, L. J., Pte. 12/10/17.
3/326 Ingram, R. H., Cpl. 14/8/15.
3/3047 Jackson, W. E., Pte. 19/10/17
3/3502 Jaffrey, H. T., Pte. Date unknown.
12/1087 James, A., Pte. 16/9/16.
3/3076 James, J., Pte. 11/4/18.
3/994 Jamieson, R. J., 22/9/16.
3/2760 Jeffs, R. J. Date unknown.
3/262 Jenkins, T. O. L., Pte. 30/10/18
3/2125 Jones, D. G., Pte. M.M. 25/7/17.
3/3002 Jones, G. O., Pte. Date unknown.
3/1775 Jones, N. W., Pte. 26/9/16.
3/2084 Joy, C. R., Pte. Date unknown
51740 Judd, H. L., Pte. 29/11/17.
3/1244 Jupp, J. W., Pte. 2nd occasion. 15/9/16.
3/1523 Jury, H. T., Pte. Date unknown.
3/3048 Keen, E. F., Pte. Date unknown.
3/2027 Keen, R. R., Pte. 12/10/17
3/2532 Keller, R., Pte. 5/4/18.
3/744 Kelly, J., Cpl. 27/10/15.
3/3028 Kerr, E., Pte. Date unknown.
3/3571 Kerr, H., Pte. 25/5/18.
23/1711 Kerr, J., Pte. 10/8/17.
3/2482 Kidd, A., Capt. 29/5/17.
3/3460 Kings, H. S. G. S. Pte. 13/9/18
12/3680 Kingston, G., Pte. 3/12/17.
3/3139 Kinvig, N. J. M., Pte. 13/9/18
3/962 Klenner, A. W., Pte. 16/9/16
12417 Kummer, H. H., Pte. Date unknown.
3/1171 Kyle, L. A., Pte. M.M. 25/8/18
3/1403 Langford, T. H., Pte. 20/7/17
3/2755 Lark, H. J., Pte. 14/10/17.
3/420a Laseron, E. B. M., Pte. 2nd occasion. 29/11/17.
3/2226 Lawry, W. M., Pte. 24/8/18.
3/2816 Layther, A. J., Pte. Date unknown.
72916 Leach, R. M., Pte. 27/10/18.
3/3359 Leitch, S., Pte. 5/4/18.
24/1211 Lennett, A. W., Pte. Date unknown.
3/1173 Leonard, S. L., Pte.
3/1405 Lewis, S. R., Pte. 27/8/18.
6/1899 Llewellyn, M., Pte. Date unknown.
8/2973 Low, F. R., Pte. 14/9/18.
52682 Macalpin, A. T., Pte. 15/8/18
3/2463 McAllister, G., Pte. Date unknown.
3/2063 McCarthy, H. C., Pte.
3/1232 McCarthy, I., Pte. Date unknown.
24/851 McCarthy, J., Pte. M.M. 15/9/16.
3/1277 McCaw, J., Pte. Date unknown.
17/339 McConnell, T. D., Cpl. M.M. 12/8/16.
3/433 McCrae, D., Pte. 9/8/15. Gallipoli.
3/1712 McCulloch, R., Pte. 17/11/16. 2nd occasion.
12/187 McEwan, F. Date unknown.

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NOMINAL ROLL OF WOUNDED—(Continued)

3/852 McFarlane, W. S., Pte. 20/9/16
3/1068 McIlraith, E. S. G., Pte. 29/11/17.
3/1786 McKenzie, A. W., Pte. 16/9/16
3/2201 McLauchlan, F. A., Pte. 27/8/18.
McLean, H. J., Lt.-Col. C.B.E. 27/8/15. Gallipoli.
3/2512 McLeod, G. M., Pte. 30/3/18.
8/2996 McPherson, D. C., Pte. 26/8/18
3/2230 McPherson, J. Pte. 27/5/17.
3/91 McNaughton, G. S., Pte. 25-29/4/15. Gallipoli.
3/1530 Mackie, H. J., Pte. 22/9/16.
3/89 Maney, C. E., Cpl. 7/10/17.
3/1120 Marshall, J. A., Capt. 2/6/17.
26/1640 Marshall, J., Pte. 25/1/18.
3/1057 Martin, H., Pte. 16/10/17.
3/1680 Martin, N. L., Cpl. 16/9/16
3/1732 Matthews, B. E., Pte. 16/9/16
3/3575 Meikle, T., Pte. 19/2/18.
3/3466 Meltzer, I., Pte.
3/2175 Millar, T. C., Pte. 7/6/17.
3/1249 Milne, A. K., Pte. 21/9/16.
3/1249 Milne, A. K., Pte. 25/8/18.
3/707 Moeller, R., Pte. Date unknown.
3/2703 Monro, F. R., Pte. Date unknown.
3/3512 Moore, F. B., Pte. 19/2/18.
3/1065 Moore, J. C., Pte. 25/5/18.
3/909 Moran, H. D., L/Cpl. 23/9/16.
3/425 Morris, E., L/Cpl. 9/5/18.
3/3029 Morrissey, W. F., Pte. 15/10/17
3/907 Moyle, A. R., Cpl. 16/9/16.
3/709 Munro, P., Cpl. 5/10/17.
3/2533 Myers, L. M., Pte. Date unknown
3/274 Napier, R. W., Pte., 25-29/4/15 Gallipoli.
3/676 Neill, H., Pte. Date unknown.
3/1220 Nelson, A. D., Capt. M.C. 2/10/17.
3/466 Nelson, T. H., Pte. 27/8/15. Gallipoli.
3/1412 Neville, G., Pte. Date unknown.
2/1597a Nicholson, J. J., Pte. 10/11/16
18172 Nichoson, J. S., Capt. 11/8/18*
3/276 Nicholson, L. D., Pte. 25-29/4/15. Gallipoli.
12/242 Nicholson, T. B., Pte. Date unknown.
3/145 Norrie, E. R., Sgt. M.S.M. Date unknown. Gallipoli.
3/434 Oates, W. L., Pte. 28/8/15.
3/1787 O'Connor, T. J. 20/9/16
3/1183 O'Hara, J. C., Pte. 15/9/16.
49453 O'Sullivan, N. C., Pte. 13/9/18
3/818 Olds, J., Pte. D.C.M. 20/7/17 2nd occasion.
3/2477 Olson, A. J., Pte. Date unknown.
3/2151 Omundsen, O., Pte. 2/2/18.
12/2431 Padley, W. G., Pte. 2nd occasion. 3/10/17.
5/139 Parker, T., Pte. 5/4/18.
3/1076 Parkinson, W. H., Q.M.S., M.S.M., 1/10/16.
3/2451 Parnell, R. P., Pte. 13/10/17.
3/940 Paterson, S. A., Pte. 17/11/17.
3/1545 Paton, H. B., Pte. 22/9/16.
6/1146 Pearless, W. R., Lieut.-Col. V.D. 7/5/15. Gallipoli
3/3365 Penman, J. A., Pte. 25/1/18.
51626 Penwright, L. E., Pte. 4/9/18.
11111 Perry, T, Pte. 5/4/18
3/917 Peters, V. C., Pte. 25/8/18
3/2886 Petersen, A. O., Pte. 3/12/17
3/3030 Pether, S. G., Pte. 29/4/18.
3/1186 Petrie, A. J., Pte. 1/10/16.
3/2608 Pettit, L. D., Pte. 4/9/18.
7/159 Phillips, F. L., Pte. Date unknown.
3/3517 Phillips, I., Pte. 19/2/18
24/1782 Pickering, W. T., Pte. Date unknown.
3/279 Pirihi, N., Pte. 23/6/15. Gallipoli.
3/279 Pirihi, N., Sgt. 25/8/18.
3/507 Porter, W. C., L/Cpl. 14/9/16
3/3846 Possenniskie, H. L., Pte. 30/10/18.
12/2087 Powick, E. J., Pte. Date unknown.
3/3367 Pretty, E., Pte. 23/11/17
3/1243 Prior, W. H., Capt. M.C. 10/6/17.
3/2234 Quartermain, L. B., Pte. 13/9/18
3/2250 Quin, A. J., Pte. 25/1/18.
3/1084 Raistrick, F., Pte. 25/6/17.
3/1417 Rankin, A., Pte. Date unknown.
11/206 Redstone, L. H. R., Dvr. 12/8/16.
17/281 Reeves, J. W., Pte. 23/9/16.
3/1791 Regan, T. J., Pte. 7/6/17.
3/3472 Reidy, M. J., Pte. 28/3/18
3/440 Reynolds, T. E., Pte. 25-29/4/15.
3/2921 Rhind, S. O., Capt. M.C. 2nd occasion. 18/2/18.
3/2184 Richardson, V. H., Pte. 1/10/16
3/282 Roberts, A., W.O.I. D.C.M., M.M. 12/9/18.
3/3518 Robinson, C. W., Pte. 28/3/18.
24/1801 Rothery, A. V., Cpl. 25/5/18.
3/2464 Rowband, F. A. N., Pte. 5/1/18.
3/965 Rowe, G. S., Pte. 15/8/16.
3/1421 Roy, W., Pte. 31/12/17.

* N.Z.D.C. attached.

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NOMINAL ROLL OF WOUNDED—(Continued)

3/1279 Russell, C. H., Pte.
3/1639 Salisbury, W. J., Pte. 7/6/17.
53969 Sanderson, A. E., Pte. 2/10/18
3/2186 Scott, B. L., Pte. Date unknown.
3/2874 Serpell, S. L., Capt. M.C. 12/10/17.
3/183 Short, A. V., Capt. M.C. Sept., 1916.
3/1137 Sievewright, W. McL. Pte. 17/9/16.
3/1723 Simcoe, B. A., Pte. 16/9/16.
3/2481 Simcox, J. E. L., Capt. 30/8/18
3/2416 Simson, R. A., Pte. Date unknown.
3/2470 Sinclair, L. H., Pte. Date unknown.
3/2627 Sindle, C. McG. Pte. Date unknown.
3/722 Skinner, W., Pte. 21/9/16.
6/3466 Slade, H. R., Pte. M.M. 16/10/17.
3/225 Sloan, W. J., Pte. 11/6/15.
3/1280 Smith, E. T., Pte. Date unknown.
3/2127 Smith, F. W., Pte. 4/12/17.
3/928 Smith, J. J. Pte. 21/9/16.
3/2039 Smith, L., Pte. 2nd occasion. 1/11/18.
3/2498 Smith, T. B., Pte. 2nd occasion 29/11/17.
3/137a Smout, H. G., Cpl. 29/3/18.
3/3473 Sneddon, W. D., Pte. 7/8/18.
3/2860 Spedding, I. N. N., Capt., 31/12/17.
3/926 Spencer, W. A. H., Pte. Date unknown.
3/1797 Spooner, F. W., Pte. 10/6/17
3/1798 Stephenson, L. J., Pte. 17/11/16
3/1897a Squire, F. J., Pte. 7/6/17.
3/3528 Squire, H. V., Pte. 13/9/18.
3/1197 Stapley, R. H., Pte. 18/9/16.
58615 Stedman, S. I., Pte. 25/8/18
6/555 Story, C. F., Pte. 21/9/16.
3/2757 Strachan, A., Pte. Date unknown.
24/295 Straight, C., Pte. 15/9/16.
25612 Stunell, H. R., Pte. 27/3/18
3/1088 Swanick, R., Pte. 18/10/17
3/2316 Sycamore, W., Pte. 4/10/17.
3/1200 Tate, F. T., Pte. 20/9/16.
3/150a Tait, W. S., Sgt. 27/8/15. Gallipoli.
3/1201 Taylor, A. E., Pte. 1/10/16.
13/239 Taylor, J., Pte. 15/9/16.
3/1672 Thomas, F. W., Sgt. 23/9/16.
3/2471 Thompson, F., Pte. 16/8/17.
3/90a Thompson, W. G., Pte. 9/8/15 Gallipoli.
3/1565 Thomson, W. J., Pte.
3/2307 Tiernev, G. T., Pte. 8/10/17.
31766 Tilsley, W. A., Pte. 29/11/17.
23/304 Todd, W. C., Pte. Date unknown.
8/2487 Toy, W., Pte. M.M. 2nd occasion. 27/3/18.
3/1685 Tozer, S. T., Pte. 24/6/15. Gallipoli.
3/155a Trotter, A. M., Capt. 9/8/16.
3/1429 Tuck, F., Pte. 12/10/17.
3/1243a Turner, W., Pte. Date unknown.
3/181 Wachner, A., Pte. 15/6/15.
3/1124 Whyte, A. S., Capt. 13/4/18.
3/94a Willis, T. S., Pte. 11/8/15. Gallipoli.
3/1099 Urwin, G., Pte. 20/9/16.
3/1205 Veitch, C. G. C. H., Pte. Date unknown.
3/3399 Verry, F. W., Pte. 28/7/18.
3/457 Wakeling, W., L/Cpl. 7/6/17
3/1568 Walker, A., Pte. 4/10/17.
3/1726 Walker, L., Pte. 23/9/16.
14/656a Ward, E., Pte. 1/9/18.
3/3688 Ward, H., Pte. 13/9/18.
3/2825 Watkin, R. A., Pte.
3/1102 Waugh, A. F., Pte. 16/9/16
3/1800 Webb, L. H. B., Pte. 23/9/16.
3/1728 Webster, L. F., Pte. Date unknown.
3/3590 Weight, L. J., Pte.
3/2474 Weir, J. K., Pte. 25/1/18.
6/2332 Wells, J. E., Pte. 19/9/16.
6/3502 Wells, R. C., Pte. 20/9/16.
4/0 Whalley, G., Cpl.
3/934 White, R. N., Sgt. 30/9/17.
51937 Whitley, F., Pte. 29/1/18
3/1567 Whyte, E. E., Pte., 20/6/16.
3/2827 Wight, C. B., Pte. 12/10/17.
3/294 Wilcox, P., L/Cpl. Date unknown.
3/2211 Wilks, F., Pte. 2nd occasion. 20/7/17.
3/731 Williams, G. F., Pte. 22/9/16.
3/1207 Wilson, E. J., Cpl. Date unknown.
68136 Wilson, F., Pte. 30/10/18.
3/3480 Winkelmann, A. C. T., Pte. 24/8/18.
3/2536 Wood, G., Pte. 8/10/17.
32979 Wood, H. J., Pte. Date unknown.
10/3793 Wooding, F. C., Pte. 22/5/16.
3/186 Woolley, F., Pte. 16/9/16.
3/169a Worsop, A. A. K., Pte. 27/8/15
3/736 Wright, A. H. B., Pte. 22/9/16
3/1731 Yeoman, A. B., Pte. 21/9/16.
3/3183 Young, J. B., Pte. 25/8/18.

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APPENDIX A.

V. New Zealand Army Nursing Service

Personal Embarked for Service

	Date of Despatch	Total
Samoan Expeditionary Force	15 Aug., 1914	7
Samoan Reliefs	..	4
For service with Australian Nursing Service	1 Apr., 1915	12
For service abroad	8 Apr., 1915	50
For service abroad	21 May, 1915	31
Per Hospital Ship No. 1	10 July, 1915	80
	14 Aug., 1915	6
	18 Sept., 1915	5
	9 Oct., 1915	11
Per Hospital Ship No. 2	6 Dec., 1915	72
Per Hospital Ship No. 1 (2nd commission) ..	9 Jan., 1916	53
Hospital Ship No. 1 (2nd commission) ..	6 Jan., 1916	14
Hospital Ship No. 2 (2nd commission) ..	12 Nov., 1916	21
Hospital Ship No. 1 (3rd commission) ..	18 Jan., 1917	14
Hospital Ship No. 2 (3rd commission) ..	22 Sept., 1917	16
Hospital Ship No. 1 (4th commission) ..	20 Oct., 1917	7
Hospital Ship No. 2 (3rd com.) 2nd voyage	31 Jan., 1918	1
Hospital Ship No. 2 (4th commission) ..	1 June, 1918	7
Hospital Ship No. 1 (5th commission) ..	6 July, 1918	6
Hospital Ship No. 2 (4th com.) 2nd voyage	19 Oct., 1918	2
On transports	..	131
Total	..	550*

*Includes 19 masseuses.

Died: 13. Including 10 drowned in "Marquette."

VI. Specifications of Hospital Ships:

No. 1 N.Z.H.S. MAHENO:

U.S.S. Coy.; gross tonnage 5,282 tons; length, 400.4 ft.; breadth, 50.2 feet. Inter-colonial passenger trade New Zealand—Australia. Medical officers, 7; O.R., 59; nurses, 10. Capacity, 340 cot cases. Charter, 25th May, 1915.

No. 2 N.Z.H.S. MARAMA:

U.S.S. Coy.; 6437 tons gross; length, 420 feet; breadth, 52.2 feet. Passenger trade New Zealand—United States. Medical officers, 9; O.R., 66; nurses, 27; cots, 592. Charter, 3rd November, 1915.

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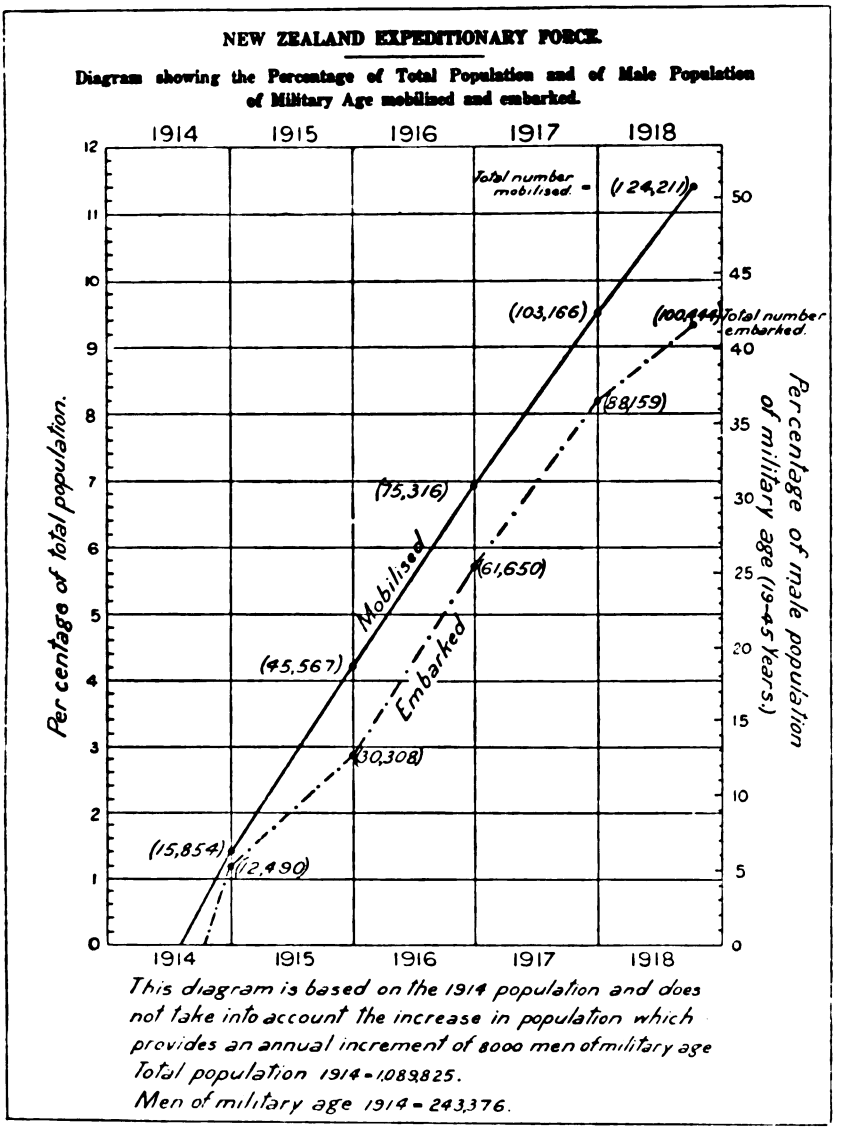
I. Graph Showing Percentage of Population Recruited in New Zealand.

1.


NEW ZEALAND EXPEDITIONARY FORCE.
Diagram showing the Percentage of Total Population and of Male Population of Military Age mobilised and embarked.
1914
1915
1916
1917
1918
Total number mobilised. (124,211)
(103,166)
(100,444) Total number embarked.
(88/89)
(75,316)
(61,650)
(45,567)
(30,308)
(15,854)
(12,490)
Mobilised
Embarked
Per centage of total population.
Percentage of male population of military age (19-45 Years.)
This diagram is based on the 1914 population and does not take into account the increase in population which provides an annual increment of 8000 men of military age
Total population 1914 = 1,088,825.
Men of military age 1914 = 243,376.

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APPENDIX B.

II. Return showing casualties to New Zealand Expeditionary Force from outbreak of war to 12th November, 1918.*

Month	Officers					Other Ranks					Grand Total
	Dead	Missing	Prisoners	Wounded	Total	Dead	Missing	Prisoners	Wounded	Total	
Month											
1915											
May ..	35	5	...	59	99	159	30	...	1346	1535	1634
June ..	9	...	...	26	35	432	181	...	596	1209	1244
July ..	...	3	...	16	19	126	...	1	272	399	418
August ..	29	7	...	75	111	439	84	...	881	1404	1515
September..	11	2	...	30	43	393	332	19	1556	2390	2343
October ..	5	...	...	2	7	101	19	...	179	299	306
Nov'ber ..	17	6	...	8	31	140	...	4	285	429	460
Dec'ber ..	3	...	...	...	3	50	...	...	153	203	206
1916											
January ..	11	...	...	1	12	477	...	1	...	478	490
February ..	6	...	...	...	6	173	...	...	16	189	195
March ..	1	...	...	...	1	78	28	...	...	106	107
April ..	...	...	...	...	...	24	1	...	...	25	25
May ..	1	...	...	...	1	99	...	...	43	142	143
June ..	14	...	...	22	36	223	...	...	498	721	757
July ..	18	...	...	42	60	321	13	...	945	1279	1339
August ..	8	2	1	27	38	165	15	5	586	771	609
September..	48	...	...	127	175	492	...	17	2448	2957	3132
October ..	48	4	...	71	123	1189	199	1	2898	4287	4419
Nov'ber ..	10	...	...	6	16	140	24	6	211	381	397
Dec'ber ..	3	...	...	5	8	252	...	2	51	305	313
1917											
January ..	7	...	...	14	21	239	...	...	232	471	492
February ..	1	...	...	9	10	97	...	...	157	254	264
March ..	5	...	...	18	23	131	54	5	255	445	468
April ..	1	...	...	9	10	170	...	7	208	385	395
May ..	3	...	...	13	16	143	...	6	389	538	554
June ..	40	...	...	179	219	950	...	1	3931	4882	5101
July ..	5	...	2	28	35	341	87	1	1084	1513	1548
August ..	23	1	...	61	85	557	...	23	1553	2133	2218
September..	2	...	1	8	11	117	...	4	419	540	551
October ..	88	2	...	156	246	878	35	...	2748	3661	3907
Nov'ber ..	18	2	...	61	81	958	150	11	1978	3097	3178
Dec'ber ..	17	...	1	44	62	541	...	...	1205	1746	1808
1918											
January ..	8	...	...	20	28	424	...	2	752	1178	1206
February ..	7	...	...	38	45	186	...	...	411	597	642
March ..	4	...	...	15	19	75	...	...	354	429	448
April ..	54	1	...	116	171	831	...	15	2184	3030	3201
May ..	19	1	1	46	67	532	...	230	1075	1837	1904
June ..	5	...	...	12	17	150	13	...	312	475	492
July ..	6	...	...	9	15	66	...	...	107	173	188
August ..	22	...	...	54	76	255	...	...	815	1070	1146
September..	59	...	...	136	195	1106	17	7	3319	4449	4644
October ..	41	1	...	86	128	725	62	...	1942	2729	2857
Nov'ber ..	43	2	...	73	118	604	...	5	1246	1855	1972
Totals	755	39	6	1722	2522	15549	1344	373	39640	56906	59428
Less numbers posted in error and subsequently accounted for....	2	35	2	2	41	...	1246	21	98	1383	1424
Net Totals	753	4	4	1720	2481	15549	80	352	39542	55523	58004

*On dates as reported in New Zealand. The totai embarked was 92,860.

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III. Analysis of 1579 deaths by Disease in 92,860 N.Z.E.F. troops embarked in New Zealand for service over seas from the outbreak of War to 12th Nov., 1918.

CERTIFIED CAUSES OF DEATH BY DISEASES

	Addison's Disease	1		Mumps	1
(i)	Anæmia	4		Nephritis	30
	Angina Pectoris	1		Neuritis (multiple)	1
	Appendicitis	31		Otitis Media	3
	Cancer	11		Pancreatitis (acute)	1
	Cholera	2		Paratyphoid (A. and B.)	2
	Diabetes	6		Peritonitis (general)	9
	Diphtheria	9		Pleurisy	20
(ii)	Dysentery	81	(viii)	Pneumonia	578
	Enteritis	13	(ix)	Poisoning	5
(iii)	Hæmorrhage	11		P.U.O.	5
	Hydatid	1	(x)	Rheumatic Fever	4
	Heart Diseases	51		Sarcoma	6
(iv)	Influenza	152		Scarlet Fever	3
	Intestinal obstruction	4		Small Pox	6
	Jaundice	10		Sunstroke	2
(v)	Liver diseases	3		Tetanus	3
(vi)	Major Septic	22	(xi)	Tuberculosis	149
	Malaria	61	(xii)	Typhoid	126
	Measles	15		Ulcer (gastric)	2
(vii)	Meningitis	115		V.D.	3
	Mental States	9		Other Causes	7

NOTES

(i) Lymphatic Leukæmia, 2; Pernicous Anæmia, 2.

(ii) Includes Baccillary and Amœbic Dysentery, and Liver Abscess.

(iii) Cerebral Hæmorrhage, 5; of Lungs, 1; Hæmatemesis, 1; Hæmaturia, 1; other Hæmorrhages, not specified, 3.

(iv) Where other cause not specified.

(v) Cirrhosis, 1; Acute Yellow Atrophy, 1; Hepatitis, 1.

(vi) Abscess, Subphrenic, 1; of Lung, 1; not specified, 3; Cellulitis, 4; Septicæmia, 7; Toxamia, 1; Osteo-Myelitis, 2; "Septic Throat," 3.

(vii) C.S.M., 109; Encephalitis, 1; other forms, exclusive of Tubercular Meningitis, 5.

(viii) Includes Broncho-pneumonia and Septic Bronchitis.

(ix) Arsenical, 1; Alcoholic, 2; Morphia habit, 1; other forms of poisoning not specified, 1.

(x) Includes Sub-acute Rheumatism, 2; Chronic Myelgia, 1; Rheumatic Fever 1.

(xi) Tubercular infection of lungs and other systems.

(xii) Includes Enteric and "Enterica" group.

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APP. B. IV. COMPOSITION OF NEW ZEALAND DIVISION on 1st DECEMBER, 1918.—PERSONNEL.

DETAIL	Staff & Spl. Appts.		Field Artillery		Engineers		Signal Service		Infantry		Machine Gun Corps		A.S.C.		N.Z.M.C.		A.V.S.		M.M. Police	A.O.S.		Gas Services		Interpreters		A.P. Service (O.R.)	Chaplains (Officers)	Employment Coy.		TOTAL PERSONNEL		
	Officers	Other Ranks	Officers	Other Ranks	Officers	Other Ranks	Officers	Other Ranks	Officers	Other Ranks	Officers	Other Ranks	Officers	Other Ranks	Officers	Other Ranks	Officers	Other Ranks		Officers	Other Ranks	Officers	Other Ranks	Officers	Other Ranks		Officers	Other Ranks	Officers	Other Ranks	TOTALS
Headquarters	13	50	—	—	—	—	—	—	—	—	—	—	—	9	2	5	1	1	25	1	5	1	6	1	11	4	17	—	—	36	116	152
Headquarters, Div. Artillery ...	5	—	—	18	—	1	—	—	—	—	—	—	—	1	—	—	—	—		—	—	—	—	—	—	—	—	—	—	5	20	25
2 Feild Artillery Brigades ...	—	—	54	1590	—	—	—	—	—	—	—	—	—	—	—	—	2	8		2	—	—	—	—	—	—	—	—	—	58	1608	1666
2 Medium T.M. Batteries ...	—	—	8	106	—	—	—	—	—	—	—	—	—	—	—	—	—	—		—	—	—	2	—	—	—	—	—	—	8	108	116
1 Divisional Ammunition Col.	—	—	14	570	—	—	—	—	—	—	—	—	—	—	1	—	—	3		—	—	—	—	—	—	—	—	—	—	15	573	588
Headquarters, Div. Engineers	—	—	—	—	2	10	—	—	—	—	—	—	—	—	1	—	—	—		—	—	—	—	—	—	—	—	—	—	3	10	13
3 Field Companies	—	—	—	—	18	630	—	—	—	—	—	—	—	—	—	—	—	—		—	—	—	—	—	—	—	—	—	—	18	630	648
1 Divisional Signal Coy. ...	—	—	—	—	—	—	12	303	—	—	—	—	—	6	—	—	—	—		—	—	—	—	—	—	—	—	—	—	12	309	321
3 Infantry Bde. Headquarters	24	6	—	—	—	—	—	—	—	39	—	—	—	15	—	—	—	3		—	9	—	—	—	—	9	—	—	—	24	81	105
12 Infantry Battalions ...	—	—	—	—	—	—	—	—	444	11592	—	—	—	—	12	—	—	—		—	12	—	—	—	—	—	—	—	—	456	11604	12060
3 Light Trench Mortar Batteries	—	—	—	—	—	—	—	—	12	138	—	—	—	—	—	—	—	—		—	—	—	—	—	—	—	—	—	—	12	138	150
1 Machine Gun Battalion ...	—	—	—	—	—	—	—	—	—	—	48	878	—	—	1	—	—	1		—	1	—	—	—	—	—	—	—	—	49	880	929
1 Pioneer Battalion	—	—	—	—	—	—	—	—	33	—	—	—	—	—	1	—	—	—		—	1	—	—	—	—	—	—	—	—	34	986	1020
1 Divisional Train	—	—	—	—	—	—	—	—	—	—	—	—	19	393	1	—	—	—		—	—	—	—	—	—	3	—	—	—	20	396	416
3 Field Ambulances	—	—	—	—	—	—	—	—	—	—	—	—	—	147	30	546	—	—		—	—	—	—	—	—	—	—	—	—	30	693	723
1 Mobile Veterinary Section ...	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—	1	18		—	—	—	—	—	—	—	—	—	—	1	20	21
1 Employment Company ...	—	—	—	—	—	—	—	—	—	985	—	—	—	—	—	—	—	—		—	—	—	—	—	—	—	—	5	523	5	523	528
Total Division ...	42	56	76	2284	20	641	12	303	489	12754	48	878	19	573	51	551	4	34	25	1	30	1	16	1	11	16	17	5	523	786	18695	19481
ONE INFT. BRIGADE GROUP:																																
1 Inf. Bde. Headquarters ...	8	2	—	—	—	—	—	—	—	13	—	—	—	5	—	—	—	1		—	3	—	—	—	—	3	—	—	—	8	27	35
1 Brigade Signal Section ...	—	—	—	—	—	—	1	24	—	—	—	—	—	—	—	—	—	—		—	—	—	—	—	—	—	—	—	—	1	24	25
4 Infantry Battalions ...	—	—	—	—	—	—	—	—	148	3864	—	—	—	—	4	—	—	—		—	4	—	—	—	—	—	—	—	—	152	3868	4020
1 Light Trench Mortar Bty.	—	—	—	—	—	—	—	—	4	46	—	—	—	—	—	—	—	—		—	—	—	—	—	—	—	—	—	—	4	46	50
1 Field Company	—	—	—	—	6	210	—	—	—	—	—	—	—	—	—	—	—	—		—	—	—	—	—	—	—	—	—	—	6	210	216
1 Company A.S.C.	—	—	—	—	—	—	—	—	—	—	—	—	3	72	—	—	—	—		—	—	—	—	—	—	—	—	—	—	3	72	75
1 Field Ambulance ...	—	—	—	—	—	—	—	—	—	—	—	—	—	49	10	182	—	—		—	—	—	—	—	—	—	—	—	—	10	231	241
Total One Brigade Group ...	8	2			6	210	1	24	152	3923	—	—	3	126	14	182	—	1		—	7					3		—	—	184	4478	4662

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I. Note on Medical Arrangements for the Landing at Anzac.

The Official History of the War, Medical Services General History, Vol. IV., gives much valuable information on this point, some of which is not referred to in the text of this book. The general tenor of the commentary on the failure of the wounded evacuations is as follows:—

(a) The initial failure of the medical services was due to difficulties with which not only the Medical but all other Administrative Services had to contend and was the result of a lack of previous training in amphibious operations and, more especially, to a miscalculation of the extent of the opposition. The original scheme previsied a rapid and considerable advance inland and the retention of wounded ashore for two or three days at least. The 15th, the 16th, and the 2nd Australian Stationary Hospitals were to be landed at once to receive the casualties.

(b) The necessity for using the transports for wounded was not seriously considered, consequently they were not equipped for the reception of casualties.

"This seems an unfortunate oversight, for if there was any intention whatever to accommodate serious cases on the transports adequate equipment should have been provided.... What ever fault there was lay in the neglect to make provision for a reverse at the landings.... The conditions were worse at Anzac owing to want of small craft and of organisation for loading ships. The responsibility for this did not rest with the medical authorities.... There was neither means nor room for retaining the casualties ashore for the treatment or until they could be sorted out for embarkation on hospital ships or transports, as had been intended: It was imperative to clear them from the beaches as rapidly as possible. Unfortunately the arrangements for doing so broke down and the utmost confusion prevailed. There was no guiding or directing hand. The D.M.S. was on the *Arcadian* but the use of the wireless for obtaining information of what was happening was denied him. Classifying the casualties into seriously and slightly wounded became impossible—seriously wounded were embarked on the transports and slightly wounded on the hospital ships. The Gascon Hospital Ship, for example, had received 300 slightly wounded the first day and was consequently more than half full with that class of case and unable to take its proper complement of seriously wounded."

(c) The official history supports the contention of Colonel Nevile Manders, our A.D.M.S., that Lemnos would have made a suitable base for holding the seriously wounded as the following passage shows:—

"But it would have been feasible to establish hospitals with a large amount of accommodation on the Island of Lemnos, and if this had been done in anticipation of the landing on the Peninsula much of the trouble would have been avoided. The wounded could have been received there in the first instance and arrangements could have been made for their further evacuation to Egypt, Malta, and England. Unfortunately no hospital arrangements had been made on shore at Mudros nor any medical administration established there until towards the end of May."

As evidence of the feasibility of the establishment of General Hospitals on Lemnos it is to be noted that at the end of December, 1915, there were actually 2 general hospitals, 4 stationary hospitals and 1 C.C.S. open at Mudros with an aggregate bed state of 6,336 beds and a possibility of expansion to double that number.

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II. Dysentery at Anzac.

In the text it is stated that the earlier forms of Dysentery seen at Anzac were Amœbic. In order to avoid discussion on a highly contentious matter the references in the text are solely to contemporary documents and express the current opinions. But the following passage from the official history, Medical Service General History Vol. III. page 432 illustrates a conflicting opinion held by many Pathologists.

> "After the evacuation of Gallipoli a large proportion of the troops, mainly Australian and Indian were employed in the Canal Zone. It is not surprising therefore that the two main diseases noted were Dysentery and Malaria. The Dysentery was a relic of Gallipoli, and was at first diagnosed almost universally as being amœbic in type owing to the fact that in the protozoological examinations *Entamoeba. Coli* had been mistaken for *Entamoeba Hystolitica.* As soon, however, as the laboratories were staffed with men trained in tropical medicine the true nature of the disease was shown to be bacilliary, and this continued to be the prevailing type throughout the campaign, although there was a certain proportion of true amœbic dysentery amongst Indian troops brought by them to the country."

A final review of the matter was made at the Annual Meeting of the British Medical Association, held in London in April, 1919. At this great congress most of the pathologists and sanitarians of England, the Dominions and the United States of America who had worked in the war zones were present. The conclusions arrived at were these: Dysentery is a disease of great military importance. Most diarrhœas occurring in armies are Dysentery; and the incidence of Dysentery in armies is directly proportionate to the activities of the pathologists. The knowledge obtained during the Great War was very valuable but much work and time will be required to reconcile the various divergencies of opinion and the controversies which have arisen in the attempt to explain and interpret the results of experimental observation.

As regards Amœbic Dysentery, the Liverpool School of Tropical Medicine had recently shown that infestation by *Entamoeba Hystolitica* is universal in England and apparently without pathological significance. Professor Yorke in his paper read at the Annual Meeting gave the results of over 4000 examinations of convalescent dysenterics. He found 11.5 per cent. of *Entamoeba Hystolitica* carriers. He pointed out that until recently carriers of *Entamoeba Hystolitica* were regarded as dangerous to the community and that it was held that so long as a man harboured the cysts he might be subject to a relapse of acute dysentery or to hepatic abscess; but, as the result of the examination of a very considerable number of persons who had never been out of England, it became clear that *Entamoeba Hystolitica* was indigenous to England and had been so probably from time immemorial. Thus, among 1,098 young recruits 5.6 per cent. were carriers and in 207 lunatics there were 9.7 per cent. Miners in South Wales were found to be more heavily infected than the rest of the community. These figures coincided with those of O'Connor and Wenyon in Egypt in 1917, where 5.3 per cent. of the healthy soldiers and 13.7 per cent. of healthy natives were shown to be carriers.

In 1916 Clifford and Dobell carrying out investigations initiated by Wenyon showed that out of 110 New Zealanders from Gallipoli 11.8 per cent. were infested by *Entamoeba Hystolitica.*

As there is no character by which it is possible, with certainty to distinguish the vegetative stage of *Entamoeba Hystolitica* from **Entamoeba** *Coli* an error in diagnosis was easily made more especially having in view the high carrier rate of the normal soldier population in Egypt; hence possibly the confusion in the early diagnosis of the "Gallipoli flux." We may conclude, then, that by far the greater part of the disease was Baccilliary not Amœbic Dysentery. The baccilliary dysenteries of the Balkans and Gallipoli were "Shiga" in type.

(for references see Bibliography Appendix II.)

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III. Scale of Rations on Gallipoli.

G.R.O.,
Q.M.G.,
13th April, 1915.

Rations Scale of:—

The scale of Rations after leaving Egypt will be:—

1¼ lbs. Fresh Meat or 1 lb. (nominal) preserved meat.
1¼ lbs, Bread or 1 lb. Biscuit or 1 lb. Flour.
4 ozs. Bacon.
3 ozs. Cheese.
2 ozs. Peas, Beans or dried Potatoes.
⅝ ozs. Tea.
¼ lb. Jam.
3 ozs. Sugar.
½ oz. Salt, 1/20 oz. Mustard, 1/36 oz. Pepper.
1/10 gill Limejuice.
½ gill Rum.
Tobacco not exceeding 2 ozs. per week.
} at discretion of G.O.C. on recommendation of S.M.O.

M.E.F.,
G.R.O.,
2nd May, 1915.

"The issue of Cigarettes, Tobacco and Matches to troops is approved."

M.E.F.,
G.R.O., 294,
18th June, 1915.

"The following scale of equivalents will obtain when the various commodities are available."

4 ozs. Jam. =
6 ozs. Preserved Meat, or
10 ozs. Fresh Meat, or
4 ozs. Golden Syrup, or
3 ozs. Cheese.

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APPENDIX D.

I. MEDICAL SCHOOLS OF INSTRUCTION. NEW ZEALAND DIVISION JANUARY, 1917.

Corps Medical Officers' Training School, Estaires.

The following is a list of lectures and demonstrations included in the curriculum—

ORGANISATION AND ADMINISTRATION.

1. Rank in the Army distinguishing Badges. Customs of the Service.
2. Routine Correspondence. Returns and Reports.
3. Military Books and Manuals and their uses.
4. The Composition of a Division.
5. Duties of the General Staff branch of a Division.
6. Duties of "A" and "Q" Branch.
7. Medical Arrangements of a Division.
8. Supplies.
9. Transport.
10. Discipline, Military Law.
11. The Ordnance Department.
12. Administration of a Section of Field Ambulance.

FIELD WORK.

1. Military Map Reading and use of the Compass.
2. Construction of Dug-outs and splinter proofs.
3. Gas Defence and Box Respirator Drill.
4. Inter-communication, the Signal Service.
5. Duties of an R.M.O. during active operations.
6. Evacuation of wounded by Field Ambulances.
7. Horse management and common ailments of the horse.
8. Riding lessons.
9. Care of Motors and Motor Transport.

MILITARY HYGIENE.

1. Duties of an R.M.O. i/c. of a Unit.
2. Hygiene of the March.
3. Sources of Water Supply, the use of the Water Cart. Water Testing.
4. Sanitation of Billets. Rations and cooking. Rest.
5. Lecture and Demonstration. Field Sanitation.
6. Demonstration of Sanitary appliances and water purification on large scale by Water Filtration Barges.
7. Biology of the Louse. Louse infestation.
8. Organisation of Divisional Baths and Laundries.
9. Anti-typhoid Inoculations.

MEDICAL AND SURGICAL SUBJECTS.

1. Treatment of Wounded in Field Ambulances.
2. Treatment of Wounded in C.C.S.
3. After Treatment of wounded in Stationary and Base Hospitals.
4. Treatment of gassed cases at C.C.S.
5. Trench Foot etiology and treatment.
6. P.U.O. and Trench Fever.
7. War Nephritis.
8. Shell Shock Neurasthenia and Malingering.

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II. EXAMINATION PAPER.
SET AT II. ANZAC CORPS MEDICAL OFFICERS' SCHOOL, 4th COURSE, 1916/1917.

1. Give the various methods of purifying water for drinking purposes. Explain the process that takes place in the water cart.
2. What are the powers of a Commanding Officer in dealing with an N.C.O ?
   If the case should be remanded for a Field General Court Martial state what steps are necessary for you to take,—
   (i) As regards the Summary of Evidence?
   (ii) What documents are attached to the Application for a F.G.C.M.?
3. Describe briefly what use can be made of the following books,—
   (i) Field Service Regulations;
   (ii) King's Regulations;
   (iii) Field Service Pocket Book.
4. As Transport Officer to your Unit, what are the chief points you would attend to,—
   (i) Making a daily visit to your Transport lines;
   (ii) When on Trek?
5. As Medical Officer to a Regiment,—
   (i) What personnel have you under your command, and what are their duties?
   (ii) Your Unit being in Billets, what steps would you take to improve the sanitary condition of your Area, and the comfort of the men?
6. State briefly what recommendations you would make to your O.C. to prevent the occurrence of Trench Foot amongst the men of your your Unit.
7. Your battalion is going to attack. What arrangements would you think advisable to make,—
   (i) Before the attack?
   (ii) During the Attack?
   (iii) After the attack, when your Battalion has reached their objective and consolidated the position?
8. The medical organisation of an Army is divided into three Zones. What are they and what nature of medical units are there in each?
9. Explain briefly the organisation of the Staff of a Division and mention some of the duties performed by the various branches of the Staff.
10. Describe how a Division in the Field is fed, and how the supplies reach your unit.
11. As Medical Officer to a Regiment, mention briefly the main points regarding Hygiene of the March.
12. What method would you take to make your Aid Post gas-proof. On the gas alarm being sounded, what action would you take during and after the gas attack?
13. Describe briefly how you would indicate the position of your Aid Post on a squared map.
14. State your opinion of the Syllbaus of Training, and mention any suggestions as to its improvement.

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III. N.Z. DIVISIONAL SANITARY SCHOOL.

This course was five days and was intended originally to be a Corps affair but the D.D.M.S. decided to leave it to Divisions to carry out. Two pupils from each Regimental Sanitary detachment attended. Billets and rations were provided by No. 1 N.Z. Field Ambulance.

The Syllabus of instruction given was founded on F.S.R. part II. Chapter XI. "Duties of Sanitary Personnel." In addition there were lectures dealing with the causation of disease founded on the R.A.M.C. Training Manual, Chapter V. The demonstrations were of a practical nature. Most of the day was spent in the open, lectures being taken in the late afternoon.

The following is a typical syllabus:—

SYLLABUS OF INSTRUCTION
CORPS SCHOOL OF FIELD SANITATION FOR N.C.O.'s AND MEN.

1st.Day 29th January, 1917.

8.0 a.m. Class assembles at No. 1 N.Z. Field Ambulance. Preparation of Billet and instruction in making straw mats.
12 noon Dinner.
3.0 p.m. Initial Lecture:—
(a) Duties of a Regimental Sanitary Detachment. Sanitary responsibilities of O.C. and R.M.O.
(b) Explanation of the aims and objects of sanitation.
(c) Outline of course of training.
3.45 p.m. Break.
4.0 p.m. Lecture.
The Causes of Infectious Disease.
Germs.
Infections. Disinfectants.
Carriers.

* * * *

2nd Day. 30th January, 1917.

7.30 a.m. Breakfast.
8.0 a.m. Parade and Inspection.
9.0 a.m. Lecture: Construction of various types of incinerators.
10.0 a.m. Practical demonstration of incineration of faeces by N.Z. Sanitary Section at Bac-St-Maur and Sailly.
12 noon Dinner.
1.0 p.m. Construction of Incinerators.
3.30 p.m. Lecture. Life History of the Fly.
4.15 p.m. Break.
4.30 p.m. Latrines and anti-fly measures. Diseases due to fly-born infections.

* * * *

3rd Day. 31st January, 1917.

7.30 a.m. Carry on.
9.0 a.m. Lecture: Disposal of Waste products. Soil Contamination. Ablution benches.
10.0 a.m Practical demonstration of Field Cooker and improvised ovens. Construction of Sanitary appliances and food receptacles. Class will be divided up into 2 sections and time occupied as indicated above till 3.30 p.m.
3.45 p.m. Lecture Construction and sanitation of cook-house.
4.30 p.m. Repetition.

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4thDay. 1st February, 1917.

9.0 a.m. Visit to D.R.S. and M.O.'s T.S.
2.0 p.m. Inspection of Billets in the Divisional Area. Visit to Field Punishment Camp.
3.30 p.m. Lecture:
(a) Sanitation of Billets.
(b) Sanitation on the March.
(c) Disinfection of Billets and dug-outs.
4.15 p.m. Lecture: Drainage.

* * * *

5th Day. 2nd February, 1917.

9.0 a.m. Few words on good and bad meat. Disposal of offal. Dead animals.
9.30 a.m. Inspection of slaughtering places.
10.30 a.m. Lecture: Sanitation of Horse Lines.
11.0 a.m. Suggestions from the class.

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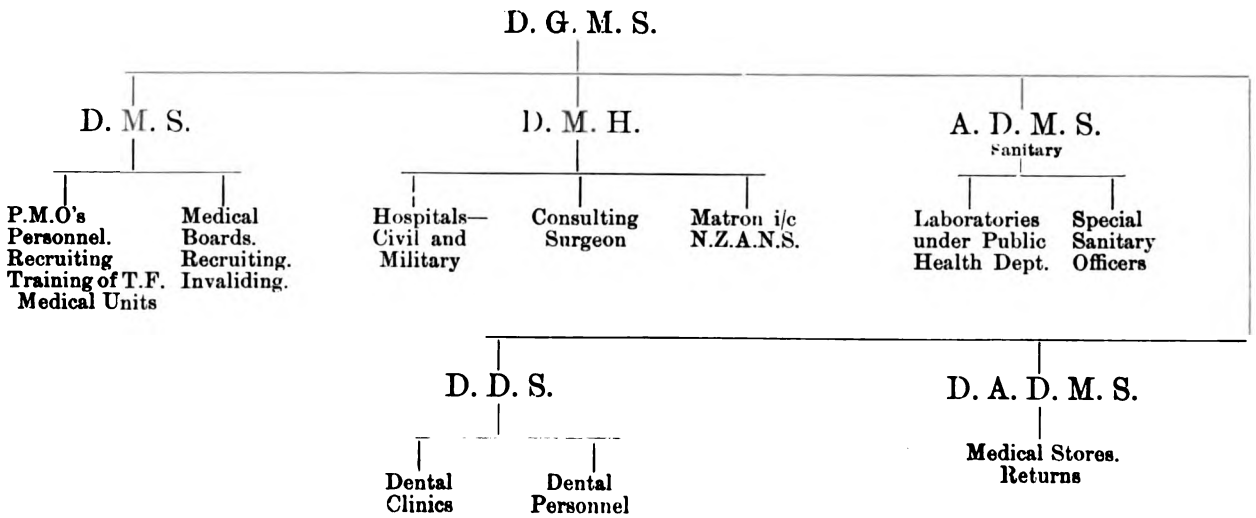
APPENDIX E.

War Organisation of Medical Headquarters in New Zealand in 1918



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II. WAR PENSIONS IN NEW ZEALAND.

Extract from the Annual Report of the Commissioner of Pensions for year ending 31st March, 1924.

APPENDIX I.—MEDICAL ADMINISTRATION.

The following table sets out the nature of the disabilities for which war pensions are being granted.

In many cases a pensioner is suffering from more than one disability, but in this classification only the dominant disability is considered, so that the total number of these is the same as the total number of individuals in receipt of war pension on the 31st March, 1924.

	Perm.	Temp.	Total
Wounds			
Upper extremity	1,577	600	2,177
Lower extremity	1,648	858	2,506
Head and neck	440	289	729
Thorax	356	292	648
Abdomen	160	109	269
	4,181	2,148	6,329
Amputations—			
Upper extremity	430	8	438
Lower extremity	584	17	601
Double	39	—	39
	1,053	25	1,078
Special senses—			
Ocular:			
Totally blind	21	—	21
Loss of one eye	337	9	346
Other disabilities of eye	150	33	183
	508	42	550
Auditory	261	84	345
Nasal	2	16	18
Respiratory system—			
Pulmonary tuberculosis	6	1,462	1,468
Other diseases	23	929	952
	29	2,391	2,420
Circulatory system	95	358	453
Nervous system—			
Organic disease	27	31	58
Functional disease	30	827	857
	57	858	915
Insanity	2	28	30
Gastro-intestinal	43	271	314
Genito-urinary	43	121	164
General diseases	93	848	941

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Fractures (not due to wounds)—			
Upper extremity	54	28	82
Lower extremity	52	40	92
	106	68	174
Diseases of bone	14	18	32
Injuries of joints (not due to wounds)	204	242	446
Spinal disease	9	81	90
Deformities	38	23	61
Disease of skin	3	8	11
Miscellaneous	43	101	144
	6,784	7,731	14,515

APPENDIX II.—BIBLIOGRAPHY.

Note to the Student of Military Medical History:—The History of the New Zealand Medical Services should be read in conjunction with the *Official History of New Zealand's Effort in the Great War*, (4 vols.) published by the New Zealand Government, of which the text, the maps, and many illustrations will supplement deficiencies. For more detailed information on the Medical Administration and Operations of the N.Z.E.F. at the Overseas Bases, in Egypt, Gallipoli and France, the student is directed to the collators' typescript notes and compilations bound in four volumes quarto to be found in the Library of General Headquarters at Wellington. The compilation, upon which most of this volume is based, includes a daily précis of events for the years 1915, 1916, 1917, inclusive, copies of all important operation orders, medical memoranda and correspondence with historical notes on the principal war diseases, all arranged in chronological order with indices and a bibliography. The fourth volume contains all the sanitary memoranda issued to the A.D.M.S. of the Division during the period covered. In the G.H.Q. library also is included a series of contemporary works dealing with war medicine and surgery collected at London Headquarters in 1916-1919, with many official pamplets and memoranda issued by the armies in France or by the War Office.

For matters appertaining to Medical Administration in New Zealand reference should be made to the *Appendices to Parliamentary Papers*, more especially the reports of the D.M.S. and the D.G.M.S. included in the annual reports of the G.O.C., New Zealand Forces from 1912 onwards. In the *New Zealand Year Book* some information as to Statistics, Medical and Military is available, but fuller details will be found in the annual reports on the *Health of the Troops in New Zealand Camps*, compiled by the A.D.M.S. Sanitary for the years 1916-1919.

The war volumes of *The New Zealand Medical Journal*, edited by Lt.-Col. J. S. Elliott, N.Z.M.C., contain a number of valuable articles on war medical matters and medical administration in New Zealand.

The short Bibliography which follows comprises only those books to which reference is made in the text or those which have been found most helpful to the compiler. The references in Medical Literature are to contemporary articles written by immediate observers and, in most instances, are the earliest references known to the compiler; amongst them will be found many contributions by N.Z.M.C. officers.

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